

LITERATURE REVIEW OF CONCEPTS

**Psychological Resiliency
Final Report
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Jaye Wald, Ph.D.
University of British Columbia

Steven Taylor, Ph.D.
University of British Columbia

Gordon J. G. Asmundson, Ph.D.
University of Regina

Kerry L. Jang, Ph.D.
University of British Columbia

Jennifer Stapleton, MA
University of Regina

DRDC Toronto Scientific Authority:
Don McCreary
(416) 635-2008

Defence R&D Canada – Toronto

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Scientific Authority

Dr. Don McCreary

Approved by

Dr. Joseph Baranski

Acting Head, Command Effectiveness and Behaviour Section

Approved for release by

K. M. Sutton

Chair, Document Review and Library Committee

Abstract

This report provides a detailed literature review of the current state of knowledge on resiliency and its application to military personnel. In this report we summarize (1) the current, accepted definitions of resiliency, (2) factors contributing to resiliency, (3) theories of resiliency, (4) empirical research findings on resiliency in protecting individuals from adverse outcomes associated with acute or chronic stress, (5) empirical research findings on resiliency in military personnel and other high-risk occupations, and (6) resiliency measures and describe their development and validation. Existing definitions implicate resiliency with the ability to adapt and successfully cope with adversity, life stressors, and traumatic events. However, findings from this review demonstrate the lack of a uniform or accepted definition of resiliency. Research to date has resulted in the identification of several individual traits and environmental situations that are contributing factors to resiliency, and this has led to recent efforts to develop and validate emerging interactive resiliency factor models. The theoretical bases of resiliency remains controversial and many existing theories have received modest empirical investigation. Furthermore, the methodologies used in many of these conceptually-based studies are poor and results are limited in their generalizability. Empirical research on protective factors remains limited, and their inter-relationships to risk factors and exposure factors remains unclear. Relatively few studies have investigated resiliency in military populations. These studies have primarily investigated protective factors among resilient individuals who have experienced combat exposure (e.g., prisoners of war). Yet, much more is to be learned about resiliency across the range of military personnel experiences (e.g., peace keepers). Lastly, our review identified numerous measures of resiliency, and of related constructs, however, many lack sufficient validation. To further advance our knowledge of resiliency, future research will need to use more sophisticated methodologies and measurement strategies, which can be validated across a range of populations. Such research efforts have the potential to develop and evaluate resiliency based interventions, and aid in social policy applications within military and non-military populations.

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Résumé

Le présent rapport constitue un examen détaillé de la littérature décrivant l'état actuel des connaissances sur la résilience et leur application au personnel militaire. Nous y résumons : 1) les définitions actuellement acceptées de la résilience, 2) les facteurs qui contribuent à la résilience, 3) les théories de la résilience, 4) les résultats des recherches empiriques sur la protection conférée par la résilience chez des individus soumis à des événements néfastes associés à un stress aigu ou chronique, 5) les résultats des recherches empiriques sur la résilience chez les militaires et d'autres professions à risque élevé et 6) les instruments de mesure de la résilience et les travaux scientifiques connexes décrivant leur élaboration et leur validation. Selon les définitions existantes, la résilience est associée à la capacité de s'adapter et de réussir à faire face à des événements néfastes et traumatisants et aux facteurs de stress de la vie. Toutefois, dans le cadre de cette étude, on a constaté qu'il n'existe pas de définition uniforme ou universellement acceptée de la résilience. Jusqu'à présent, les recherches ont permis de cerner plusieurs traits individuels et situations environnementales qui sont des facteurs contribuant à la résilience, et ces résultats ont été à l'origine des récents efforts pour élaborer et valider des modèles émergents et interactifs de facteurs de résilience. Les bases théoriques de la résilience demeurent controversées, et bon nombre des théories existantes ont fait l'objet de très peu de recherches empiriques. En outre, les méthodes employées dans un grand nombre de ces études fondées sur des concepts sont de piètre qualité; la généralisation des résultats est donc restreinte. La recherche empirique sur les facteurs de protection demeure limitée; la relation entre ces facteurs, d'une part, et les facteurs de risque ainsi que les facteurs d'exposition, d'autre part, demeure obscure. Relativement peu d'études se sont penchées sur la résilience dans les populations militaires, et elles portaient principalement sur les facteurs de protection chez les individus résilients qui ont vécu des situations de combat (p. ex., des prisonniers de guerre). Il nous en reste beaucoup à apprendre sur la résilience face au vaste éventail des expériences militaires (p. ex., chez les membres des forces de maintien de la paix). Enfin, notre étude a mis au jour de nombreux instruments de mesure de la résilience et de concepts connexes, dont beaucoup n'ont cependant pas fait l'objet d'une validation suffisante. Pour approfondir davantage notre connaissance de la résilience, les recherches à venir devront faire appel à des méthodes et à des stratégies de mesure plus sophistiquées, lesquelles devront pouvoir être validées chez différentes populations. De telles initiatives de recherche permettent en théorie d'élaborer et d'évaluer des interventions fondées sur la résilience et favorisent les applications axées sur les politiques sociales à l'intérieur de populations militaires et non militaires.

Executive summary

Background

There is growing recognition that psychological resiliency (herein referred to as resiliency) plays an important role in how individuals adapt to stressful life events. Yet resiliency remains a poorly defined concept in the traumatic stress literature. Traditionally, research has focused on pathological reactions and negative outcomes that arise from exposure to extreme stressors, which includes an increased risk of psychopathology, physical illness, and disability (e.g., Breslau et al., 2001). Yet, research shows that there are notable individual differences in the trauma response. To illustrate, research suggests that about 40-60% of adults in the community have been exposed to trauma (Kessler et al., 1995; Yehuda, 2004), yet only a fraction of the general population develops posttraumatic stress disorder (8%: American Psychiatric Association [APA], 2000). These findings suggest that other factors, in addition to trauma exposure, must be taken into account when examining the causes of trauma-related psychopathology, such as posttraumatic stress disorder (PTSD). These include both risk and protective factors. The overemphasis in the research literature on adverse reactions to trauma has limited our understanding of the individual's ability to adapt and successfully cope with acute and chronic stress (Bonanno et al., 2004, 2005). Broadening research to focus more on adaptive responses and outcomes to trauma exposure will lead to a more complete understanding of stress-related psychopathology, as well as its treatment and prevention.

Much of our knowledge of resiliency has primarily emerged from the developmental psychology literature. The research has extensively studied children and adolescents who are at risk of exposure, or who have been exposed, to stressful life experiences (e.g., Garmezy, 1983; Rutter, 1985). There is a need to extend resiliency research to other populations who are at heightened risk of directly experiencing or witnessing traumatic events involving human suffering and death. Populations who are regularly exposed to acute and chronic stressors in the line of duty include civilian emergency services workers (e.g., paramedics, police officers, firefighters) and military personnel (e.g., combat soldiers, peacekeepers, peacemakers). A large body of research has shown a high prevalence of traumatic stress disorders, such as PTSD, in these groups (e.g., Asmundson et al., 2002; Beaton, et al., 1999; North, et al., 2002a; see Pern et al., 2000, for a review). The role of resiliency to protect these individuals from duty-related stress reactions and psychopathology remains an understudied, yet critical area of research. To date, only a handful of studies have investigated resiliency or related constructs in these populations (e.g., Bartone, 1999; King et al., 1998; Sutker et al., 1995; Taft et al., 1999; Zakin et al., 2003). Resiliency studies in high-risk civilian occupations are also limited, and thus far have focused more on general coping responses and adjustment (e.g., Beaton et al., 1999; North, et al., 2002b), rather than resiliency.

An important outcome from psychological resiliency research concerns the applications to assessment, treatment, and prevention of psychopathology. One way to reduce the adverse impact of acute and chronic traumatic stress in high-risk occupational groups is to develop and evaluate screening programs to identify those at risk of developing pathological stress reactions. Another important area is to develop evidence-based intervention programs designed to promote psychological resiliency, and thus, possibly prevent the development of trauma-related stress disorders. Recent research findings have shown that resiliency in individuals with PTSD (arising from various types of traumata) can be enhanced by psychosocial and pharmacological interventions (Connor et al., 2003; Davidson, et al., 2005). Attempts to replicate these results in high-risk occupations are needed.

Objective

The objective of this report was to conduct a review of the concepts, measures, and research findings associated with psychological resiliency related to acute and chronic stressors experienced by military personnel. As requested, the content of the review consists of a detailed summary of the following: (1) current, accepted definition(s) of resiliency, (2) factors contributing to resiliency, (3) theories of resiliency, (4) empirical research findings on resiliency in protecting individuals from adverse outcomes associated with acute or chronic stress, (5) empirical research findings on resiliency in military personnel and other high-risk occupations (e.g., police, firefighters, paramedics), and (6) copies of resiliency measures and associated scientific papers describing their development and validation.

The literature review provides a detailed summary of the current state of knowledge on resiliency and its application to military personnel. Results of this review will have practical implications for identifying important future research directions, and will help delineate potential clinical and social policy applications. Future research may build on our review by developing and conducting empirical research projects in this topic area.

Procedures

Our literature search strategies involved two phases between September 2005 and March 2006. In the first phase (September to December 2005), major electronic bibliographic databases were searched, including MEDLINE and PsychINFO, using the search terms resilience or resiliency. Secondary searches were completed for related concepts using the search terms of posttraumatic growth, hardiness, thriving, and stress-related growth. There was no specified time limit and articles searched were limited to English. Publication types included peer-reviewed original empirical research articles, non-empirical review articles (e.g., theoretical papers, literature reviews), conference proceedings, and other scientific works (e.g., books, book chapters, technical reports). Articles were then retrieved by the investigators or

research assistants. The second phase consisted of reviewing each article and compiling a synthesis of the relevant literature. In addition to the literature search, one of the research assistants was assigned to obtaining copies of all relevant, freely available (published or unpublished) assessment instruments and references to provide supporting documentation.

In the second phase (January 2006 to March 2006), we reviewed the remaining articles from our search results and prepared detailed summaries (as described in the above objectives). We have attached copies of all the available measures (excluding those with copyright restrictions) of resiliency and related constructs, along with references of scientific papers on their development and validation (due to copyright restrictions we were not able to provide copies of the scientific papers themselves).

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SOMMAIRE

Contexte

On reconnaît de plus en plus que la résilience psychologique (ci-après appelée « résilience ») joue un rôle important dans la manière dont les individus s'adaptent aux événements stressants de la vie. Pourtant, la résilience demeure un concept mal défini dans la littérature sur le stress traumatique. Dans le passé, les recherches se sont concentrées sur les réactions pathologiques et les résultats néfastes découlant de l'exposition à des facteurs de stress extrêmes, notamment un risque accru de psychopathologie, de maladies physiques et d'invalidité (p. ex., Breslau et coll., 2001). Cependant, les recherches indiquent qu'il existe des différences individuelles marquées dans la réponse aux traumatismes. Ainsi, selon les recherches, de 40 à 60 % des adultes de l'ensemble de la collectivité ont été exposés à un traumatisme (Kessler et coll., 1995; Yehuda, 2004), alors que le syndrome de stress post-traumatique (SSPT) n'apparaît que chez une fraction de la population générale (8 % selon l'American Psychiatric Association [APA], 2000). Il semblerait, à la lumière de ces constatations, que d'autres facteurs, en dehors de l'exposition au traumatisme, doivent entrer en ligne de compte lorsqu'on examine les causes de la psychopathologie liée à un traumatisme, comme le SSPT. Il s'agit aussi bien de facteurs de risque que de facteurs protecteurs. Le fait que les comptes rendus de recherches accordent une place prépondérante aux réactions néfastes aux traumatismes nous a empêchés de nous pencher sur la capacité de l'individu de s'adapter au stress aigu et chronique et de composer avec ces situations (Bonanno et coll., 2004, 2005). En élargissant nos recherches de manière à nous intéresser davantage aux réactions d'adaptation et aux résultats de l'exposition aux traumatismes, nous parviendrons à mieux comprendre la psychopathologie liée au stress, ainsi que son traitement et les moyens de la prévenir.

Une bonne partie de nos connaissances sur la résilience viennent en premier lieu de la littérature sur la psychologie du développement. Les recherches ont exploré en profondeur le cas des enfants et des adolescents qui sont à risque d'exposition, ou qui ont été exposés, à des expériences de vie stressantes (p. ex., Garmezy, 1983; Rutter, 1985). Il faut élargir les recherches sur la résilience de manière à englober d'autres populations qui sont exposées à un risque accru de vivre, directement ou à titre de témoins, des événements traumatiques entraînant une souffrance humaine ou le décès. Les populations qui sont systématiquement exposées à des facteurs de stress aigu et chronique dans l'exercice de leurs fonctions sont notamment les travailleurs des services d'urgence civils (p. ex., les ambulanciers, les agents de police, les pompiers) et les membres du personnel militaire (p. ex., les soldats au combat et les membres des forces de maintien de la paix et des opérations de rétablissement de la paix). Un vaste corpus de recherches a mis en lumière une forte prévalence de troubles liés au stress traumatique, comme le SSPT, dans ces groupes (p. ex., Asmundson et coll., 2002; Beaton et coll., 1999; North et coll., 2002a; voir Pern et coll., 2000, pour une analyse). Le rôle de la résilience dans la protection de ces individus contre les réactions au stress lié au travail et l'apparition d'une psychopathologie demeure un

domaine peu étudié, mais critique de la recherche. Jusqu'à présent, une petite poignée seulement d'études se sont penchées sur la résilience ou sur des concepts connexes, dans ces populations (p. ex., Barton, 1999; King et coll., 1998; Sutker et coll., 1995; Taft et coll., 1999; Zakin et coll., 2003). Les études sur la résilience dans les professions civiles à risque élevé sont également peu nombreuses et, jusqu'à présent, elles se sont concentrées davantage sur les réactions générales d'adaptation et d'ajustement (p. ex., Beaton et coll., 1999; North et coll., 2002b), que sur la résilience.

Parmi les résultats importants des études sur la résilience, mentionnons les applications qu'on peut en faire à l'évaluation, au traitement et à la prévention de la psychologie. Un moyen de réduire les effets néfastes du stress traumatique aigu et chronique chez les groupes professionnels à risque élevé consiste à élaborer et à évaluer des programmes de dépistage permettant de repérer les individus à risque de réactions pathologiques au stress. Un autre secteur important est celui des programmes d'intervention fondés sur des preuves visant à promouvoir la résilience et, par conséquent, à prévoir éventuellement l'apparition de troubles liés au stress traumatique. Selon des études récentes, il semble que la résilience chez les individus souffrant du SSPT (découlant de différents types de traumatismes) peut être rehaussée grâce à des interventions psychosociales et pharmacologiques (Connor et coll., 2003; Davidson et coll., 2005). Il faut procéder à d'autres recherches pour répéter ces résultats chez des groupes professionnels à risque élevé.

Objectif

Le présent rapport a pour objectif d'examiner les concepts, les instruments de mesure et les résultats d'études concernant la résilience psychologique face aux facteurs de stress aigu et chronique que vivent les membres du personnel militaire. Conformément à ce qui avait été demandé, la présente étude consiste en un résumé détaillé des aspects suivants : 1) définition(s) actuellement acceptée(s) de la résilience, 2) facteurs contribuant à la résilience, 3) théories de la résilience, 4) résultats des recherches empiriques sur la protection conférée par la résilience chez des individus soumis à des événements néfastes associés à un stress aigu ou chronique, 5) résultats des recherches empiriques sur la résilience chez les militaires et d'autres professions à risque élevé (p. ex., les agents de police, les pompiers, les ambulanciers) et 6) copies des instruments de mesure de la résilience et des travaux scientifiques connexes décrivant leur élaboration et leur validation.

L'analyse documentaire fournit un résumé détaillé de l'état actuel des connaissances sur la résilience et de leur application aux membres du personnel militaire. Les résultats de cette étude ont des implications pratiques; ils permettront de tracer les orientations importantes des recherches à venir et aideront à définir leurs applications éventuelles à la pratique clinique et aux politiques sociales. Les chercheurs pourront tirer parti de notre étude en élaborant et en menant à bien des projets de recherche empirique dans ce domaine précis.

Méthodologie

Nos stratégies de recherche dans la littérature publiée comportaient deux phases, lesquelles se sont déroulées entre septembre 2005 et mars 2006. Dans la première phase (septembre à décembre 2005), on a interrogé les grandes bases de données bibliographiques électroniques, notamment MEDLINE et PsychINFO, à partir du critère de recherche résilience (*resilience* ou *resiliency*). On a également effectué des interrogations secondaires au sujet de concepts connexes, à partir des critères de recherche suivants : croissance post-traumatique (*posttraumatic growth*), durabilité (*hardiness*), réussite (*thriving*) et croissance liée au stress (*stress-related growth*). On n'a pas appliqué de limites temporelles précises, et les articles visés n'étaient qu'en anglais. Parmi les types de publications compris dans la recherche, mentionnons les suivants : articles sur des recherches empiriques originales examinés par les pairs, articles sur des recherches non empiriques (p. ex., documents théoriques, analyses documentaires), comptes rendus de conférences et autres travaux scientifiques (p. ex., livres, chapitres de livres, rapports techniques). Les articles ont ensuite été extraits par les chercheurs ou les adjoints à la recherche. La deuxième phase consistait à examiner chaque article, puis à établir une synthèse de la littérature pertinente. En outre, l'un des adjoints à la recherche a eu pour mandat d'obtenir des copies de tous les instruments d'évaluation et de toutes les références pertinentes, pouvant être obtenus gratuitement (qu'il s'agisse de publications ou non), pour appuyer les recherches effectuées.

Au cours de la deuxième phase (janvier à mars 2006), nous avons examiné les articles qui restaient de nos recherches et nous en avons préparé des résumés détaillés (comme il est décrit dans les objectifs ci-dessus). Nous avons joint des copies de tous les instruments de mesure disponibles (à l'exception de ceux protégés par des droits d'auteurs) sur la résilience et les concepts connexes, ainsi que des listes de travaux scientifiques étayant l'élaboration et la validation de ces instruments (en raison des restrictions imposées par les droits d'auteurs, nous n'avons pas pu fournir des copies des documents scientifiques eux-mêmes).

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Review of the current, accepted definitions of resiliency

Overview

There are no universally accepted scientific definitions of resiliency. There are several existing definitions that share in common a number of features all implicating resiliency with human strengths, some type of disruption and growth, adaptive coping, and positive outcomes following exposure to adversity (e.g., Bonanno, 2004; Connor et al., 2003; Friborg et al., 2003; 2005; Matsen et al., 1999; Richardson, 2002). However, there are a number of distinctions made in attempts to define this construct. There currently are two major approaches to defining resiliency; a more narrow definition by Bonanno, and the broader conceptualizations offered by others.

The definition suggested by Bonanno (e.g., 2004, 2005; Bonanno et al., 2005) focuses primarily on effects of single, short-lived traumata. Accordingly, his definition of resiliency is concerned largely with responses to such events. Here, resiliency is defined by the occurrence of short-lived, mild psychological distress after a trauma, followed by a return to a pre-trauma level of adjustment. Resiliency is conceptualized as a distinct outcome trajectory that is different from recovery, in which the person may develop a disorder, such as full-blown or partial PTSD, and then recover over time. Resiliency is also distinguished from delayed onset disorders, such as delayed onset PTSD. In other words, Bonanno's definition suggests that true resiliency is not something that breaks down over time.

“Resilient individuals typically experience only transient and mild disruptions in functioning (e.g., several weeks of variability in negative affect, difficulty concentrating, or sleeplessness) and exhibit relatively stable levels of healthy adjustment across time. A key point is that although resilient individuals may experience some short-term dysregulation and variability in their emotional and physical well-being ... these reactions tend to be relatively brief and do not impede their ability to function to any significant degree. For example, resilient individuals are usually able to continue fulfilling personal and social responsibilities and to maintain a capacity for generative experiences [e.g., engaging in new, creative activities or new relationships] and positive emotions.” (Bonanno et al., 2005, p. 985)

A limitation with Bonanno's definition is the arbitrary distinction between resiliency and recovery. Resilient people, according to this author, often develop symptoms after a trauma, from which they recover over days or weeks. It is unclear how severe these symptoms must be, or how long it takes for them to abate, in order to still qualify as “resilient” rather than “recovered.” His definitions are dependent on

the way psychological symptoms are measured, which were often limited to self-report measures of depression. To illustrate, in recent bereavement studies, Bonanno defined resiliency, and distinguished it from other outcomes from loss (e.g., recovered), empirically via normative and ipsative methods (e.g., Bonanno et al., 2005). These methods may yield different results, with one method, but not the other, classifying a person as resilient. Using the normative comparison method, a trauma population of interest (e.g., bereaved group) is compared to a normative group (e.g., matched non-bereaved group) to delineate normal symptom variation from unique and context specific symptoms between groups. People are defined as resilient if their symptom scores remain within a cut-off symptom score (e.g., one standard deviation of the normative group mean score). The ipsative, or repeated measures, approach involves comparing symptoms at different assessment points before and after a trauma event to create outcome trajectories (e.g., resilient, recovered/improved, grief reaction, chronic depression). In this method, people are categorized as resilient based on cut-off scores of a depression self-report measure. Change of status at assessment points is defined by cut-off scores based on standard deviation units at each post-trauma assessment.

A further limitation is that Bonanno's conceptualization of resiliency only concerns isolated traumata (Bonanno, 2004). The concept does not seem to allow for the possibility that a person may exhibit true resiliency which may crumble over time in the face of severe, chronic stress. In other words, Bonanno seems to regard resiliency as a static or trait-like entity, rather than a dynamic process — fluctuating over time and circumstance interplaying with other variables.

In contrast to Bonanno's definition, several other investigators have grouped resiliency and recovery into a single and broader construct (e.g., Connor & Davidson, 2003; Davidson et al., 2005; King et al., 1998, 1999; Luthar & Cicchetti, 2000; McFarlane & Yehuda, 1996). Among these definitions, resiliency is typically regarded as a dynamic and context-specific construct, characterized by either the absence of stress-induced symptoms, or the natural (unaided) resolution of these symptoms, rather than a representing a personality trait.

In contrast to defining resiliency based on absent or quickly waning symptoms, other researchers have defined this construct based upon observable behavioural indicators thought to represent adaptive functioning or competency across different life domains, such as meeting developmental tasks in school (e.g., Flores et al., 2005; Matsen et al., 1995, 1999). To illustrate, in a recent study of predictors of resiliency in children, Flores et al. (2005) defined resiliency based on composite scores using behavioural measures, in which resilient children were defined as those having high functioning in 6 – 8 different areas. A problem with this categorical approach is the arbitrary classification system that is used to define resiliency (e.g., low, medium, high functioning).

Further distinctions among definitions typically involve differences in the purported source of resiliency. For example, some investigators assume that resilience is located “within the person” (e.g., Davidson et al., 2005). Other investigators (e.g., Friborg et al., 2003; King et al., 1998, Luthar, et al., 2000; Masten, 2001) propose that there are multiple sources and pathways to resiliency, including psychological and dispositional attributes and the social context (e.g., family, external support systems). There is considerable divergence in the literature with regard to the criteria or standards for resiliency, whether it is a process and outcome variable, and the nature of the adversity required for resiliency to be demonstrated (e.g., what is a sufficient exposure risk factor?).

The following are examples of these definitions:

“The human ability to adapt in the face of tragedy, trauma, adversity, hardship, and ongoing significant life stressors.” (Newman, 2005, p. 227).

“Resilience may be briefly defined as the capacity to recover or bounce back, as is inherent in its etymological origins, wherein ‘resilience’ derives from the Latin words salire (to leap or jump), and resilire (to spring back).” (Davidson et al., 2005, p. 43)

“Psychological resilience has been characterized by the ability to bounce back from negative emotional experiences and by flexible adaptation to the changing demands of stressful experiences” (Tugade & Fredrickson, 2004, p. 320).

“Resilience is a dynamic process wherein individuals display positive adaptation despite experiences of significant adversity or trauma. This term does not represent a personality trait or an attribute of the individual ... Rather, it is a two-dimensional construct that implies exposure to adversity and the manifestation of positive adjustment outcomes.” (Luthar & Cicchetti, 2000, p. 858)

“Resilience embodies the personal qualities that enable one to thrive in the face of adversity. ... Resilience is a multidimensional characteristic that varies with context, time, age, gender, and cultural origin, as well as within an individual subjected to different life circumstances.” (Connor & Davidson, 2003, p. 76)

“Resilient behavior is more than whether an individual has pathological symptoms or disorders of some sort after experiencing a major negative life event. But individuals who do not show such symptoms or disorders – despite the fact that clinically and statistically we would expect them to (due to the

nature of a given stressor) – illustrate resilient behaviour” (Miller, 2003, p. 245)

“Resilience refers to a class of phenomena characterized by good outcomes in spite of serious threats to adaptation or development” (Masten, 2001, p. 228)

Many definitions of resiliency, including Bonanno’s definition and the broader definitions proposed by others, overlap with related constructs, particularly the concepts of hardiness, thriving, and posttraumatic growth. Although these concepts share some similarities with resiliency, there also are some important definitional differences. Like the resiliency concept, these terms are sometimes defined differently by different authors.

Hardiness

Hardiness is considered to be a dispositional characteristic that is associated with, and enhances, resiliency (Kobasa, 1979; Maddi, 2002; Ramanaiah et al., 1999; Tsuang, 2000). Hardiness is defined as comprising three interrelated personality or dispositional traits characterized by three general assumptions about self and the world (Kobasa, 1979, 1982; Kobasa & Maddi, 1977; Maddi, 1967, 1970, 2002). These include (a) a sense of control over one’s life (e.g., believing that life experiences are predictable and that one has some influence in outcomes through one’s efforts); (b) commitment in terms of the ascribed meaning to one’s existence and seeing life activities as important (e.g., believing that you can find meaning in, and learn from, whatever happens, whether events be negative or positive); and (c) an openness to viewing change as a challenge (e.g., believing that change, positive or negative, is an expected part of life and that stressful life experiences are opportunities). “Hardy people” are thought to possess all three beliefs about commitment, control, and challenge (Maddi, 2002). Hardiness is said to be a relatively stable factor that contributes to resiliency against stress and illness (Bonanno, 2004; King et al., 1998; Maddi, 2005) and is associated with more active and instrumental coping efforts, and successful performance-based outcomes (Florian et al., 1995, Westman 1990).

Although supported by data, there have been challenges to the validity and utility of the hardiness concept (see Blaney & Ganellen, 1990). For example, how is hardiness distinct from other similar dispositional traits? Also, the distinction between hardiness and related terms, such as coping, growth, or well-being is unclear. It is also unclear whether hardiness affects general well-being (as opposed to influencing distress). Other criticisms have targeted the lack of clarity regarding the mechanisms and processes through which hardiness functions to protect the individual. Kobasa is unclear on whether it is a buffer between stressful life events and emotional responses to them, or whether it provides both direct and indirect opposing effects against

psychological strain arising from stressful life events. The Figure below, from Rush et al. (1995), illustrates the latter formulation of hardiness, in which it exerts direct and indirect effects on the stress response.

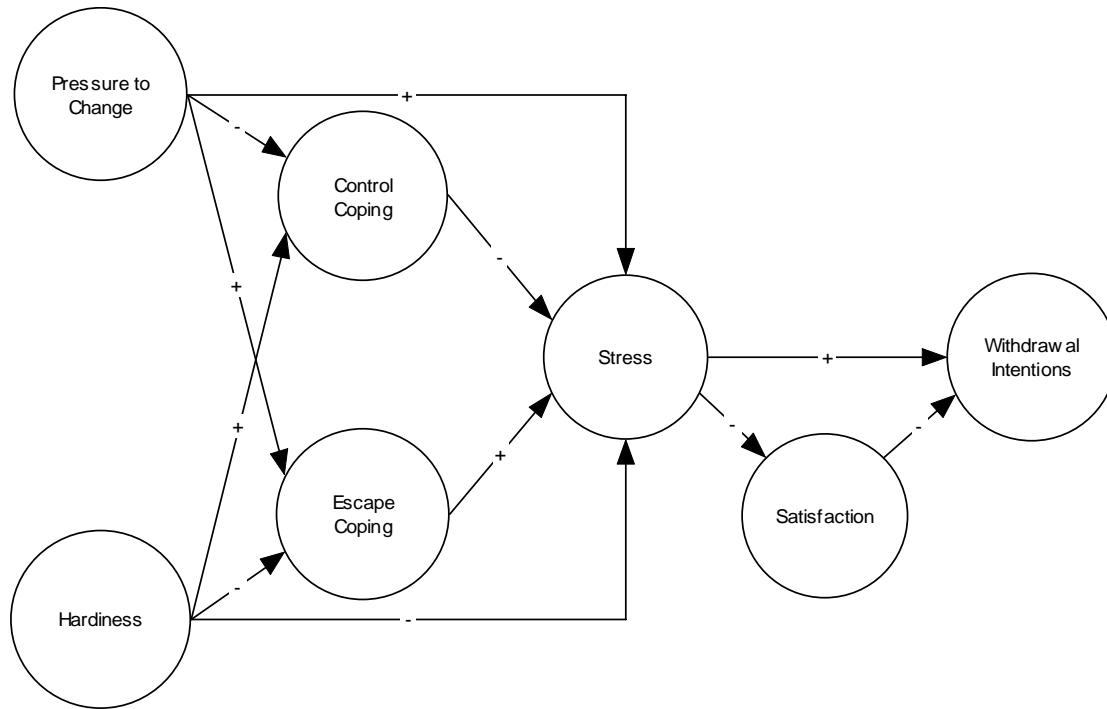


Figure 1. Structural representation of hardiness and stress.

Thriving

Thriving is distinguished from resiliency based on the nature of the outcome from adversity, in which resiliency reflects recovery to pretrauma functioning and thriving results in attainment of a higher level of functioning beyond pretrauma status (Carver, 1998; Parks, 1998). Carver (1998, p. 245) further delineates this construct as follows:

“Thriving (physical or psychological) may reflect decreased reactivity in subsequent stressors, faster recovery from subsequent stressors, or a consistently higher level of functioning.”

Psychological thriving following stress is associated with various benefits, including improved physical health and psychological well-being (Epel, et al., 1998). Other benefits thought to reflect thriving include the acquisition of new skills and

knowledge, improved confidence, and improved social relationships (Carver, 1998). Thriving is thought to reflect an outcome of a transactional coping process influenced by the characteristics of the stressor, an individual's characteristics (e.g., optimism, hope, coping resources), and environmental characteristics (e.g. social support) (Epel et al., 1998; Parks, 1998).

Although there are various definitions of thriving, and it is uncertain as to whether it is a unidimensional or multidimensional construct (Cohen et al., 1998), evidence suggest it is distinct from psychological well-being (Epel et al., 1998). But, there does not seem to be an understanding of how thriving is different from related concepts such as hardiness or posttraumatic growth (e.g., Bugental, 2004). For example, general measures of stress-related growth have been used to measure thriving (e.g., Stress-Related Growth Scale, Posttraumatic Growth Inventory), so it is unclear what is exactly being measured). The relationships between appraisals, coping processes, and thriving are also unknown.

Posttraumatic growth

This concept refers to personal development, perceived benefits, or growth that occurs as a result of trauma or adversity (e.g., Affleck & Tennen, 1996; Fontana & Rosenheck, 1998; Linley & Joseph, 2004; Tedeschi & Calhoun, 2004). Similar to thriving, but in contrast to resiliency, posttraumatic growth results in improvement beyond the person's pretrauma level of functioning and creates positive and meaningful schema changes about themselves, their life, and their relationships. This concept also differs from resiliency in that some people with so-called posttraumatic growth may display an illusory (self-deceptive) improvement in well-being or adaptive functioning after a trauma. In other words, there are two forms of posttraumatic growth; an illusory, self-deceptive form (e.g., denying that one has been affected by trauma, when, in fact, one's social and occupational functioning are severely impaired by PTSD), and a more constructive form (Maercker & Zoellner, 2004).

Linley and Joseph (2004) appear to have equated (or use interchangeably) the term posttraumatic growth with other constructs, including adversarial growth, thriving, positive adjustment, and positive adaptation. On the other hand, Tedeschi and Calhoun (2004) have attempted to identify the differences between posttraumatic growth and related concepts such as resiliency and hardiness. Although there is some evidence to suggest that posttraumatic growth is a multidimensional construct distinct from related concepts, its factor structure remains unclear. Tedeschi and Calhoun (1996, 2004) have suggested it is a multidimensional construct consisting of five domains, including an increased appreciation of life, having closer and more intimate relationships, a greater sense of personal strength, finding new life opportunities, and increased spiritual/existential development. Armeli et al. (2001) presented somewhat

similar findings, in which seven dimensions of posttraumatic growth were identified; treatment of others, religiousness, personal strength, belongingness, affect-regulation, self-understanding, and optimism. In contrast, Park et al. (1996) suggested it comprises only one dimension.

Variables that have been empirically associated with posttraumatic growth include appraisals of threat and harm (e.g., greater levels of perceived threat are associated with higher levels of growth), dispositional characteristics (e.g., personality traits such as extraversion or openness to experience), problem-focused coping, acceptance, optimism, and positive affect (e.g., Calhoun et al., 2000; Parks et al., 1996; Tedeschi & Calhoun, 1996, 2004). Models of posttraumatic growth emphasize the importance of cognitive processing and schema reconstruction (i.e., rebuilding one's beliefs about the self, other people, and the world, after a belief-shattering traumatic experience) as key underlying processes (Joseph & Linley, 2005; Tedeschi & Calhoun, 1996, 2004).

Evidence of posttraumatic growth has been identified in survivors of many different types of trauma (Linley & Joseph, 2004; Tedeschi & Calhoun, 2004). Posttraumatic growth requires, by definition, some type of adverse event (Armeli et al., 2001; Tedeschi & Calhoun, 1996). It is unclear how severe an adverse event has to be for posttraumatic growth to occur. Attempts to answer this question have been thwarted by the tendency to treat, in the research literature, the concepts of adversity, trauma, and stressful life events as synonyms. Furthermore, it is uncertain to whether posttraumatic growth itself is best conceptualized as a process or an outcome variable.

Summary

Our review of the literature demonstrates the lack of a uniform definition of resiliency. There is also a lack of consensus about its relationship to related concepts, including hardiness, thriving, and posttraumatic growth. These problematic issues have important implications for developing conceptual models, identifying factors contributing to resiliency, and using empirical findings to develop and evaluate resiliency based interventions. Thus, additional empirical research is needed to help clarify the construct of resiliency, its dimensions, and underlying processes.

Review of constructs contributing to resiliency

Overview

Much of our knowledge on the factors contributing to resiliency has emerged from the developmental psychology and psychiatry literature. Pioneer studies—such as Garmezy (e.g., 1971, 1983, 1991), Rutter (1979, 1985), Wener (1982), and Werner and Smith (1992)—identified a number of intra-individual factors, or personal resources, that are thought to contribute to resiliency in children and adolescents who did not develop psychopathology despite adversity or stressful life events (e.g., children of mentally ill parents, the effects of maternal deprivation). These investigations were primarily cross-sectional in nature, aimed at identifying single psychosocial and behavioural correlates and predictors of resiliency.

Research on single factors contributing to resiliency has been typically limited in a number of ways. By individually examining limited factors in a study, it is not possible to determine their interaction with other variables and it is not possible to examine the effects of potential confounding variables. Many of the studies cited above have been cross-sectional in nature, and thus are not able to inform us about the stability of the construct over and have limited ability to inform us about the direction and causation of these interactions.

Another problem with looking at predictors of resiliency is whether these identified single factors are veridical “protective factors” or are simply correlates of resiliency. There seems to be some confusion over the definition of a protective factor; different and definitional representations of the term tend to be used interchangeably. Moreover, it is also unclear whether these factors have a moderating or mediating relationship to resiliency. A more complete understanding of these interrelationships would lead to a greater understanding of resiliency (Tiet et al., 1998). One attempt to provide clarification on what a protective factor is provided by Luthar (1993, p. 59):

“It is limited to one that has a buffering (or main) effect at high risk but no effect at low risk and therefore involves an interaction effect. When a factor always has a beneficial effect whether at low or high risk (e.g., a main effect), it is referred to as a resource factor. The opposite of a resource factor is a risk factor, which also has a main effect on outcome, whereas the opposite of a protective factor is a vulnerability factor, which has little or no effect at low risk but magnifies a detrimental effect at high risk.”

The relationships among protective factors, risk factors, and exposure factors (e.g., the nature of the adversity or stressor) remain unclear. Much of the research suggests that the factors contributing to resiliency are pre-existing individual characteristics (via learning and genetic influences) and life circumstances, which come into play in times of adversity, stress, and trauma. Resiliency, according to current definitions, requires exposure to adversity. Research on the possibility of whether or not resiliency can be acquired through exposure to adversity or challenging life circumstances is an interesting speculation (Richardson, 2002).

Resiliency factors usually appear together (e.g., an individual who has high self-esteem is more likely to use active problem solving skills, is achievement-oriented, and is likely to have good social support). In the literature, this has been referred to as “pile up” of protective factors (Waller, 2001) or “protective chains” (Smokowski, 1998; Waller, 2001). These factors also tend to have cumulative or “ripple” effects (Masten et al., 1999; Rutter, 1993; Waller, 2001), and have been illustrated as an “asset or resource gradient,” in which higher levels of assets leads to better adjustment outcomes (Masten, 2001). As Fergusson et al. (2003, p. 61) stated,

“Vulnerability/resiliency is influenced by an accumulation of factors... positive configurations of these factors confer increased resiliency, whereas negative configurations increase vulnerability.”

Another example of this effect could explain the finding of higher intellectual functioning being a fairly robust predictor of resiliency. In this relationship, it may be the “pile up” of specific cognitive and behavioural abilities that are associated with higher intellectual functioning (e.g., better problem solving and coping skills) that contributes to resiliency.

Other methodological problems with research on contributors to resiliency are the limited number of samples in which this research has been conducted, thus limiting the generalizability of results. Furthermore, many studies that have tested predictive models on resiliency did not cross validate their results. Also problematic has been an over-reliance on retrospective self-report measures. Recently, investigations (e.g., Bonanno et al., 2004) have incorporated multiple methods and measures (e.g., peer and clinician ratings). Curtis and Cicchetti (2003) have advocated the importance of multiple levels of analysis – including biological measures – but this remains an under-utilized research approach. Another challenge is the issue of selection bias that is likely involved in many resiliency studies (e.g., people more distressed following trauma are probably going to be less likely to volunteer to participate in resiliency research).

The individual, environmental, and interacting factors shown to contribute to resiliency, which we have identified thus far in our literature review, are presented below. These findings are also summarized in Table 1.

Individual Factors

Empirical studies on individual factors (or within-person resources) have identified the following contributing factors to resiliency: (1) personality traits of adaptability, flexibility, agreeableness, extraversion, openness to experience (e.g., Dumont & Provost, 1999; Frederickson, 2001; Garmezy, 1991, Garmezy et al., 1984; Rutter, 1979; 1985; Werner & Smith, 1982), (2) self-esteem (Benson, 1997; Garmezy, 1991, Garmezy et al., 1984; Howard, 1996; Werner, 1982; Werner & Smith 1992), (3) self-mastery (Rutter, 1979; 1985), (4) intelligence (Masten et al., 1999), (5) problem-focused coping strategies (Garmezy, 1991, Garmezy et al., 1984), (6) internal locus of control (Benson, 1997; Garmezy, 1991, Garmezy et al., 1984), (7) being achievement and goal-oriented (Benson, 1997; Werner, 1982; Werner & Smith 1992), (8) higher intellectual functioning (Masten et al., 1988, 1999), (9) ego-resiliency and ego-control (Flores et al., 2005), and (10) cognitive appraisals about threat, safety, and adversity, such as benefit-finding cognitions (beliefs about benefits from adversity and using this knowledge as a coping strategy) (e.g., Affleck & Tennen, 1996). The recent emergence of the “positive psychology field” has identified other individual variables shown to contribute to resiliency, such as optimism, hope, creativity, faith, and forgiveness (e.g., see Richardson, 2002, for a review). Other emerging constructs, such as a self-enhancing bias, or the tendency to have overly positive view of oneself, has also been implicated with resiliency (e.g., Bonanno et al., 2004, 2005) but this tendency appears to also result in negative consequences over time (e.g., being seen by others as less honest).

Environmental Factors

Early investigations also examined the role of single environmental factors contributing to resiliency. These studies showed the importance of relational features, specifically social support (e.g., a connection to other competent adults within and outside the immediate family) (Flores, et al., 2005; Garmezy, 1991; Garmezy et al., 1984; Rutter, 1979; 1985; Werner 1982; Werner & Smith, 1992), and positive parenting qualities (e.g., parental presence, emotional availability, and support) (Garmezy et al., 1984; Garmezy, 1985; Masten et al., 1988, 1999; Tiet et al., 1998), in resiliency. Subsequent research findings on the role of social support in contributing to resiliency have been inconsistent, and the underlying processes between these two constructs are not clear. For example, researchers have speculated that opportunities for being able to talk about the trauma within one’s social support system may facilitate cognitive processing and provide opportunities for corrective experiences, which, in turn, leads to resiliency, rather than social support as the primary

contributing factor (e.g., Benson, 1997; Howard, 1996; Dumont & Provost, 1999; Yakim & McMahon, 2003).

Person x Environment Interactions

Despite the growing recognition of the importance of conducting studies to capture the dynamic transactional relationships and pathways among individual factors with environmental, contextual, and biological factors (e.g., Curtis & Cicchetti, 2003; Luthar & Cicchetti, 2000; Masten, 2001; Richardson, 2002), relatively little empirical research of this nature has been published. Efforts to date have resulted in the development of interactive resiliency models (e.g., the egosystemic model by Waller, 2001); but, empirical investigation of these models remains limited, particularly with regards to possible biological contributors of resiliency.

Recent studies continue to try to clarify the interrelationships between individual factors and resiliency via differences between “high-risk resilient” individuals and “high-risk vulnerable” individuals. For example, youth with high self-esteem, as compared to those with low self-esteem, are more likely to use active problem solving strategies, and are more likely to have positive adaptation outcomes (Yakin & McMahon, 2003). Similarly, Dumont and Provost (1999) demonstrated that resiliency was associated with higher self-esteem and a greater use of problem-solving or active coping strategies (e.g., using active problem solving strategies rather than avoidant strategies) than vulnerable adolescents. In another study of this type, Flores et al. (2005) showed that certain aspects of interpersonal functioning were differentially related to resilience for high-adversity (e.g., maltreated children) and low-adversity (e.g., children who were not mistreated), in which relationship features may be less important than personal resources in maltreated children. Differential influences between predictor variables have also been noted by Cicchetti and Rogosch (1997), who found that positive self-esteem, ego-resiliency, and ego-control predicted resilient functioning in maltreated children, whereas relationship features, as well as ego resiliency, proved to be more influential in nonmaltreated children.

Summary

Much of our knowledge on the factors contributing to resiliency has emerged from the developmental psychology and psychiatry literature. Research on single factors contributing to resiliency has been limited; however, some individual traits, environmental situations, and the interaction between these have been identified. The relationships among protective factors, risk factors, and exposure factors remain

unclear and need further exploration and validation. In addition, future studies need to address resiliency in a broader range adult populations.

Table 1. Characteristics of resilient people (adapted from Connor & Davidson, 2003, and expanded).

Characteristic	Reference
Achievement oriented	Werner, 1982, 1989; Werner & Smith, 1992
Action oriented approach	Rutter, 1985
Adaptability to change	Block & Block, 1980; Bonanno, et al., 2004; Dumont & Provost, 1999; Frederickson et al., 2001; Rutter, 1985; Werner, 1982, 1989; Werner & Smith, 1992
Agreeableness	Dumont & Provost, 1999; Frederickson et al., 2001
Capacity for positive emotional expression	Bonanno, 2004; Fredrickson, et al., 2003; Tugade & Fredrickson, 2004; Tugade et al., 2004; Zautra, et al. 2005
Close, secure attachment to others	Connor & Davidson, 2003; Flores et al., 2005; Fraley & Bonanno, 2004; Garmezy, 1985, 1987, 1991; Garmezy et al., 1984; Masten, et al., 1988, 1998, 1999; Rutter, 1985; Tiet et al., 1999; Werner, 1982, 1989; Werner & Smith, 1992
Commitment	Kobasa, 1979
Creativity	Simonton, 2000
Critical thinking skills	Garmezy, 1985, 1987, 1991; Garmezy et al., 1984
Educational aspiration	Flores et al., 2005
Ego-resiliency and ego-control	Cicchetti & Rogosch, 1997; Flores et al., 2005
Engaging the support of others	Rutter, 1985
Excellence	Lubinski & Benbow, 2000
Extraversion	Affleck & Tennen, 1996; Kobasa, 1979; Tedeschi & Calhoun, 1996, 2004; Tedeschi et al., 1998
Flexibility	Dumont & Provost, 1999; Frederickson et al., 2001
Good communication skills	Werner, 1982, 1989; Werner & Smith, 1992

Characteristic	Reference
Happiness	Buss, 2000
High expectancies	Garmezy, 1985, 1987, 1991; Garmezy et al., 1984
High self-esteem	Benson, 1997; Cicchetti & Rogosch, 1997; Garmezy, 1985, 1987, 1991; Garmezy et al., 1984; Howard, 1996; Masten & Reed, 2002; Werner, 1982, 1989; Werner & Smith, 1992
Higher intellectual functioning	Curtis & Cicchetti, 2003; Garmezy, 1985, 1987, 1991; Garmezy et al., 1984; Masten, et al., 1988, 1998, 1999
Internal locus of control	Garmezy, 1985, 1987, 1991; Garmezy et al., 1984; Luthar, 1991; Werner, 1982, 1989; Werner & Smith, 1992
Low avoidance or distraction strategies	Bonanno, Wortman, & Nesse, 2004
Not searching for meaning	Bonanno, Wortman, & Nesse, 2004
Openness to experience	Affleck & Tennen, 1996; Tedeschi & Calhoun, 1996, 2004; Tedeschi et al., 1998
Optimism	Affleck & Tennen, 1996; Connor & Davidson, 2003; Garmezy, 1985, 1987, 1991; Garmezy et al., 1984; Kumpfer, 1999; Masten & Reed, 2002; Peterson, 2000
Past successes	Rutter, 1985
Patience	Lyons, 1991
Perceiving positive benefits from trauma exposure	Affleck & Tennen, 1996; Aldwin, Levenson, & Spiro, 1994
Personal or collective goals	Benson, 1997; Rutter, 1985
Positive acceptance of change	Connor & Davidson, 2003
Presence of an external support system	Flores et al., 2005; Garmezy, 1985, 1987, 1991; Garmezy et al., 1984; Werner, 1982, 1989; Werner & Smith, 1992
Problem solving skills	Garmezy, 1985, 1987, 1991; Garmezy et al., 1984
Recognition of limits to control	Connor & Davidson, 2003; Kobasa, 1979; Rutter, 1985
Robust	Werner, 1982, 1989; Werner &

Characteristic	Reference
	Smith, 1992
Self-determination	Ryan & Deci, 2000; Schwartz, 2000
Self-discipline	Garmezy, 1985, 1987, 1991; Garmezy et al., 1984
Self-efficacy	Connor & Davidson, 2003; Rutter, 1985
Self-enhancement bias	Bonanno, Field, Kovacevic, & Kaltman, 2002; Bonanno, Rennie, & Dekel, 2005
Sense of humor	Garmezy, 1985, 1987, 1991; Garmezy et al., 1984; Masten & Reed, 2002; Rutter, 1985
Socially responsible	Werner, 1982, 1989; Werner & Smith, 1992
Spiritual influences, faith	Connor & Davidson, 2003; Myers, 2000
Subjective well-being	Deiner, 2000
Tolerance of negative affect	Connor & Davidson, 2003; Lyons, 1991; Werner, 1982, 1989; Werner & Smith, 1992
Trust in one's instincts	Connor & Davidson, 2003
View change or stress as a challenge or opportunity	Kobasa, 1979
Wisdom	Baltes & Staudinger, 2000

Theories of resiliency

The following is an overview of the major theories of resiliency and related constructs. See Table 2 for a summary of these theories.

Richardson et al. (1990) & Richardson (2002)

Richardson proposed what he terms as the “metatheory of resilience and resiliency,” which evolved through three different waves of resiliency inquiry. The first identified characteristics of people who effectively cope with and grow through disruptions. The second examined the processes in which people acquire these characteristics. The third was the recognition of innate resilience and our capacity to grow and develop. From this line of research, resilience was conceptualized as, “a force within everyone that drives them to seek self actualization, altruism, wisdom, and be in harmony with a spiritual source of strength” (Richardson, 2002, p. 313).

A basic assumption of this theory is the idea of a biopsychospiritual balance (homeostasis), which allows us to adapt (body, mind, and spirit) to current life circumstances. Homeostasis is routinely bombarded by stressors, adverse events, and other expected and unexpected life events, or “life prompts.” Our ability to adapt and cope with such life events are influenced by resilient qualities and previous resilient reintegrations. The interaction between daily stresses and protective factors determines whether serious disruptions will impact the individual chronically. The interaction between the life prompts and protective factors determines whether disruptions will occur. Resilient qualities are shown in the model below (see Figure 2) as up arrows effectively dealing with the life prompt and maintaining homeostasis. Life disruption changes the individual’s intact world paradigm. It may result in perceived negative or positive outcomes and a variety of emotional and appraisal responses in the immediate wake of disruption. The reintegration process leads to one of four outcomes: (1) resilient reintegration, where adaptation leads to a higher level of homeostasis, (2) return to baseline homeostasis, in an effort to move past the disruption, (3) recovery with loss, establishing a lower level of homeostasis, (4) a dysfunctional state, where maladaptive strategies (e.g., self-destructive behaviours) are used to cope with the stressor. Thus, resilience may be viewed as an outcome of successful coping abilities.

Resilient reintegration involves experiencing insight or growth through disruptions. Reintegration results in the identification or strengthening of resilient qualities. In the resiliency model, it is visualized for clients as additional protective arrows dealing with life stressors. The essence of reintegrating to homeostasis is to

heal and move past a disruption. Reintegration to biopsychospiritual homeostasis in some cases may not be an option in situations such as some permanent physical loss, moving, or death of a loved one. Recovering with loss means that people give up some motivation, hope, or drive because of the demands from life prompts. Dysfunctional reintegration occurs when people resort to substances, destructive behaviors, or other means to deal with the stressors. Most people who reintegrate dysfunctionally have “blind spots” in their introspective skills and may require therapy to gain some insight into their lives.

When evaluating the metatheory of resiliency, one must keep in mind that the simplistic linear model reflects one event as it pertains to a particular role, relationship, or experience. There are multiple simultaneous disruptive and reintegrative opportunities. There is no specific time frame within which these processes are expected to occur, and the process may take place in a matter of seconds, for minor new pieces of information, to years, for traumatic events. Resilient reintegration may also be postponed. Some people may experience a stressor, such as abuse as a child, and reintegrate with a negative coping mechanism, such as anger and distrust. Years later, the individual’s coping pattern might be disrupted by therapy and reintegrate healthier coping skills. Richardson (2002) states that, according to the theory, disruption is required to access the components of resilience because biopsychospiritual homeostasis alone does not make demands for improvement and growth. However, this theory has received some empirical investigation, which has been primarily limited to using structural equation modeling of resilient qualities in the resiliency model on samples of women (Dunn, 1994), adult children of alcoholics (Walker, 1996), and university students (Neiger, 1991). These analyses have supported this theory, and additional research efforts are needed to test this theory on other populations (e.g., high-risk trauma groups).

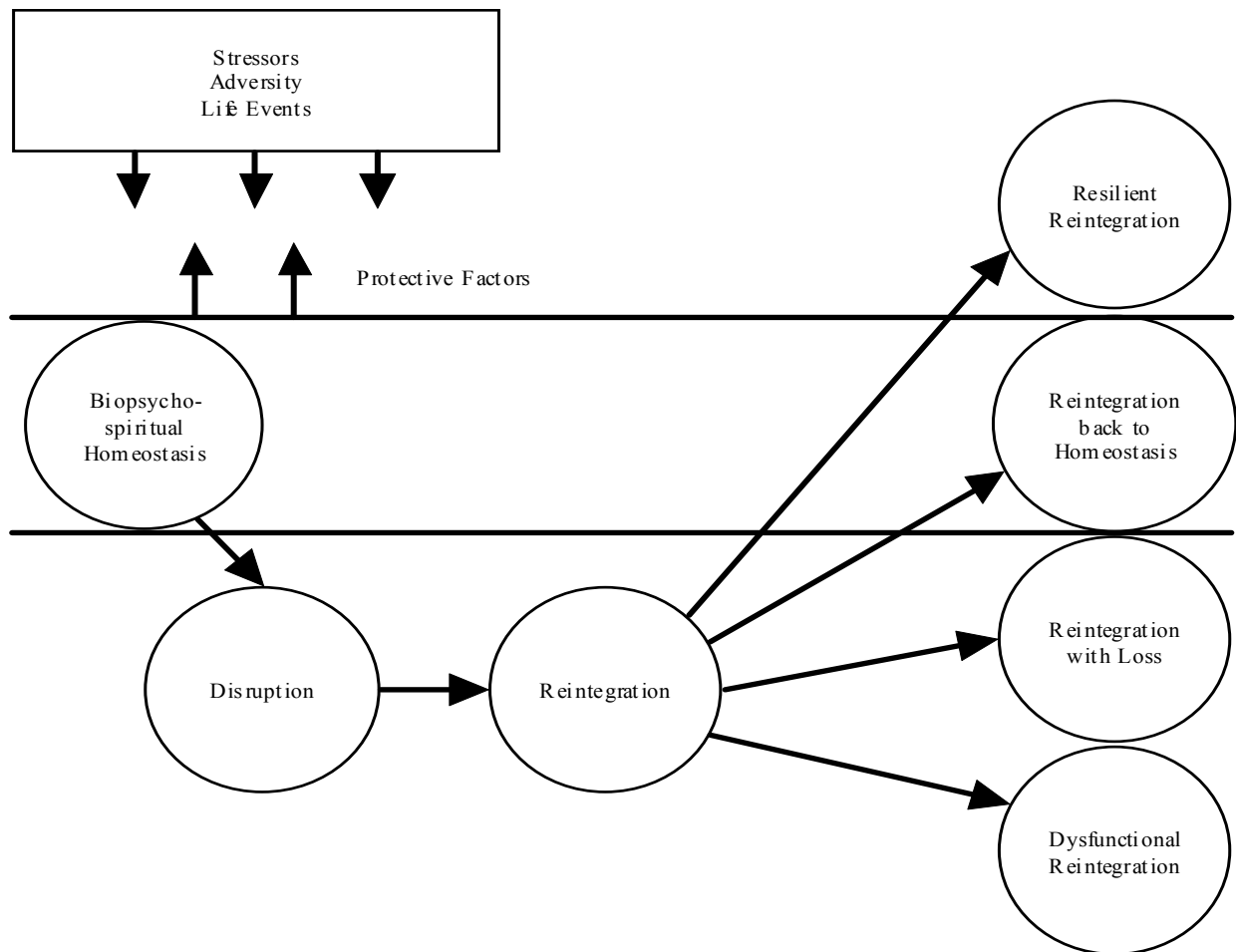


Figure 2. Richardson's resiliency model. Adapted from Richardson (2002).

Saakvitne et al. (1998)

These theorists propose a “constructivist self-development theory,” which advocates that the symptoms of a survivor of traumatic stress are “adaptive strategies” that arise to manage threats to the integrity and safety of the self. Five areas of the self are expected to be affected by traumatic events. First is the frame of reference, one’s usual way of understanding self and world, including spirituality. Second, self-capacities – defined as the capacity to recognize, tolerate, and integrate affect and maintain a benevolent inner connection with self and others – are impacted,. Third, ego-resources necessary to meet psychological needs in mature ways (e.g., abilities to be self-observing, using cognitive and social skills to maintain relationships and protect oneself) are also affected,. Fourth, central psychological needs are implicated,

reflected in disrupted cognitive schemas in five areas: safety, trust, control, esteem, and intimacy. Finally, a perceptual and memory system, including biological (neurochemical) adaptations and sensory experience, is affected.

According to Saakvitne and colleagues (1998), in response to a traumatic event, the individual must integrate the event, context, and consequences into existing beliefs about self and others. The intensity of the somatic, affective, and interpersonal components of the experience determines the availability of the event for cognitive processing. The more overwhelming or intolerable the experience, given one's self-capacities (i.e., ability to tolerate affect and maintain a sense of self in connection), the greater the need for dissociative and amnesiac defenses that preclude conscious processing of the event. The event and its implications must be incorporated into one's frame of reference and schemas about central psychological needs.

In terms of this model, growth and pain are not mutually exclusive but rather inextricably linked in recovery from trauma and loss. Posttraumatic growth is said to be linked to the increased consonance between an individual's understanding of a traumatic event and its personal meaning. Such growth occurs as an individual is able to understand his or her current experience, feelings, perceptions, beliefs, and distress in the context of the past, including past trauma and related adaptations. Growth may result in major shifts in beliefs about the self, the world, or spirituality, or in mindfulness and acceptance without resignation or serenity.

While this theory has considerable appeal, it has yet to be empirically tested and does not appear to have fueled much subsequent research. The theory lacks a clear direction and conceptualization of the construct it attempts to explain. Further research with this theory is needed.

Dienstbier (1989)

On the basis of a review of the literature, consisting largely of animal studies, Dienstbier argued that stress can "toughen" neuroendocrine responses to future stressors. Exposure to intermittent stressors was said to result in low base rates in sympathetic nervous system (SNS) arousal, and also to strong and responsive challenge- or stress-induced SNS-adrenal-medullary arousal, with resistance to brain catecholamine depletion and suppression of pituitary adrenal-cortical responses. This pattern of arousal was said to define physiological toughness and, in interaction with psychological coping, to correspond with positive performance in complex tasks, with emotional stability and immune system enhancement. These postulates have been tested a number of times since inception of the theory and have been consistently validated (e.g., Mendes et al., 2003; Tomaka et al., 1993; Weidenfeld et al., 1990)

Epel et al. (1998)

These theorists focused on physical thriving. Physical thriving results when there is a greater amount of anabolic (e.g., growth promoting) than catabolic (e.g., cortisol) hormones. Characteristics of the stressor (e.g., duration, frequency, and controllability) as well as the psychological moderators such as one's appraisal of the stressor (i.e., as a threat or a challenge) play a role in determining the profile of response to stress. When an individual appraises intermittent stressors as controllable, she or he may display a resilient profile of stress hormone responding; that is, rapid cortisol responses with quick recovery, and more importantly, cortisol adaptation when faced with similar stressors over time. This stress response is, in turn, related to better health. Cortisol adaptation to stress may serve as one potential marker of resilient psychological and physical functioning. (However, research on PTSD suggests that the picture is much more complicated than this; people with PTSD show abnormally low cortisol values, suggesting that the cortisol system is abnormally suppressed in PTSD; see Taylor, in press, for a review.)

Garmezy et al. (1984)

Garmezy and colleagues (1984) conducted the Minnesota Risk Research Project, which investigated intentional and informational-processing dysfunction in children of schizophrenic parents from 1971 to 1982. They found that most of the children did not become maladaptive adults, but grew up to be warm and competent people. Garmezy's "confident" criteria were effectiveness (work, play, and love), high expectancies, positive outlook, self-esteem, internal locus of control, self-discipline, good problem-solving skills, critical thinking skills, and humor. Garmezy's triad of resiliency included personality disposition, a supportive family environment, and an external support system.

From these studies the investigators outlined three complementary models, each involving a particular class of factors to describe the relationship between stress and adaptation. The first is the compensatory model. A compensatory factor is one that neutralizes exposure to risk. It does not interact with a risk factor, but rather, it has a direct and independent influence on the outcome of interest. Both risk and compensatory factors contribute additively to the prediction of outcome. Compensatory factors may be an active approach to solving life's problems, a tendency to perceive or construct experiences positively, even if those experiences caused pain and suffering, the ability to gain other's positive attention, and reliance on

spirituality to maintain a positive view of a meaningful life. These factors either decrease risk initially or ameliorate risk throughout development.

The second of the models was the challenge model. Here, a risk factor or stressor is treated as a potential enhancer of successful adaptation, provided that it is not excessive. Too little stress is not challenging enough, and very high levels of stress result in dysfunction. Moderate levels of stress provide a challenge that, when overcome, strengthens competence. If a challenge is successfully met, it may help prepare the person for the next difficulty. If efforts are unsuccessful, the individual may become increasingly vulnerable to risk. Resiliency develops not through evasion of risk, but in successfully engaging it.

The third model was the protective factor model. A protective factor interacts with a risk factor to reduce the probability of a negative outcome. It moderates the effect of exposure to risk. Rutter (1987) described a protective mechanism as an interactive process that helps identify “multiplicative interactions or synergistic effects in which one variable potentiates the effect of another” (p. 106). Protective factors include high IQ and better cognitive abilities related to social know-how, better parenting, and higher socioeconomic status. The protective model is different in that it acts indirectly to influence outcome.

This theory has stimulated a large number of studies and has received empirical support (Cowen et al., 1997; Fergusson, Horwood, & Lynskey, 1994; Fergusson & Lynskey, 1996; Luthar, 1999; Masten et al., 1988).

Cicchetti and Lynch (1993)

Drawing on the work of Belsky (1980), Bronfenbrenner (1977), and Cicchetti and Rizley (1981), Cicchetti and Lynch conceptualized ecological contexts as consisting of a number of nested levels with varying degrees of proximity to the individual. These levels transact with each other over time to shape the individuals development and ability to adapt to their environment. The macrosystem includes cultural beliefs and values that permeate societal and family functioning. The exosystem consists of the neighborhood and community settings in which families and children live. The microsystem incorporates the family environment that children and adults create and experience. Finally, the level of ontogenic development includes the individual and his or her own developmental adaptation. This final level reflects the belief that individuals are important agents of their own environments. Cicchetti and Lynch (1993) have hypothesized that these levels of the environment interact and transact with each other over time in shaping individual development and adaptation. In this model, context and children’s functioning are conceptualized as mutually influencing each other. Transactions between children and their contexts both allow

for continuity in children's development (and context) over time and create potentialities for change.

This theory has formed the conceptual basis for research involving diverse risks including family poverty, experiences of maltreatment, and others (Baldwin et al., 1993; Cicchetti & Lynch, 1993; Cicchetti et al., 1993; Connell, Spencer, & Aber, 1994; Crittenden, 1985; Leadbeter & Bishop, 1994)

O'Leary & Ickovics (1995)

The foundation of the concept put forth by O'Leary and Ickovics comes from the literature on resiliency, but goes beyond the view of resilience as homeostasis. It suggests a value-added construct where challenge provides an opportunity for change and growth. According to these theorists, when an individual is confronted with a challenge they may succumb or respond in one of three ways – survive, recover, or thrive (see Figure 3).

Survival implies that the individual affected by a stressor continues to function, but in an impaired fashion. For example, a victim of a violent crime, for whom the trauma of the event has instilled overwhelming fear, is afraid to leave home and therefore is unable to return to work and other daily activities. For this individual recovery was not possible because the psychological consequence of the event are so debilitating.

Recovery indicates a return to baseline. After the decrement associated with an initial challenge, the individual is able to return to previous levels of social, psychological, and occupational functioning. The victim of violent crime who returns to work and other daily activities in much the same way as prior to the event would be an example of recovery according to O'Leary and Ickovics.

Thriving involves the ability to bypass the original level of psychological functioning, to grow and to flourish. Through the interactive process of confronting and coping with challenge, a transformation occurs. The individual does not merely return to a previous state, but moves beyond it, adding value to life. Thriving may be behavioral, cognitive, and emotional. It is transformative, contingent on a fundamental cognitive shift in response to a challenge. Challenge provides the opportunity for change because it forces the individual to confront personal priorities and to reexamine their sense of self. It can also alter social roles, resulting in the acquisition of a new role, loss of an old role, or a reordering of role priorities.

Within this context, the authors suggest that there are different determinants to thriving, including individual and social resources. Individual resources include, but

are not limited to, hardiness, active coping, a sense of coherence, optimism, and ability to find meaning in challenge. Social resources include formal (e.g., organizational or institutional) or informal (e.g., friends, family, co-workers) resources.

In a critique of this theory, Carver (1998) suggested that it falls short in its description of the outcome of thriving. The problem with this sort of cognitive outcome is that responses of this form are harder than behavioral responses to distinguish from rationalization or dissonance reduction, which would not be regarded as thriving under any definition of the term.

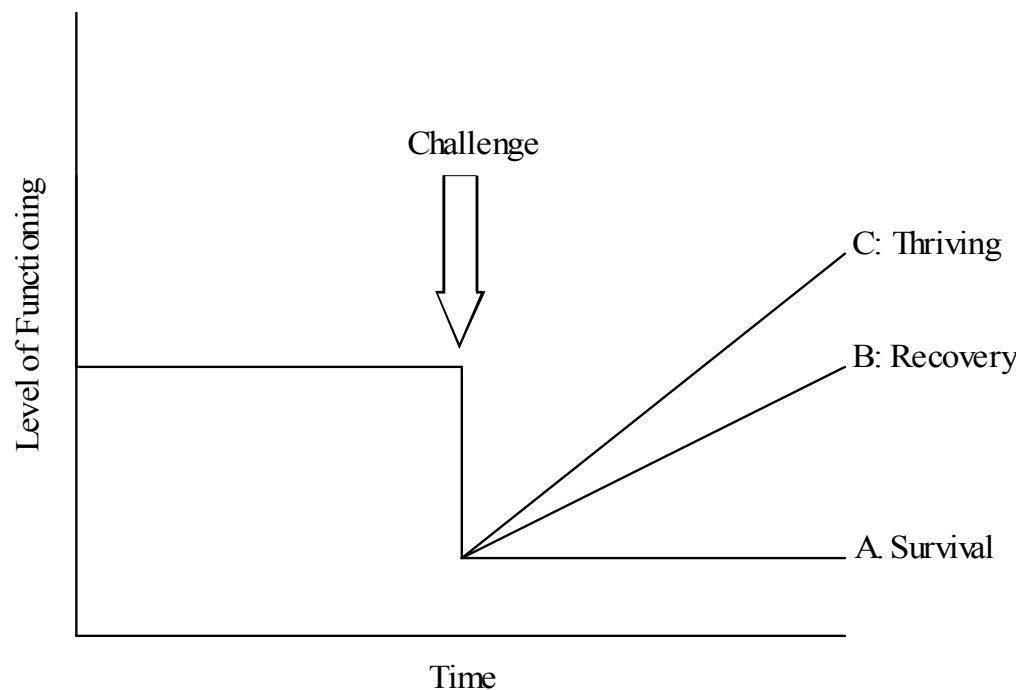


Figure 3. Outcomes of challenge: Potential consequences for a single hypothetical stressor.
Adapted from O'Leary & Ickovics (1995).

Rubiero et al. (in press)

These authors proposed a neural circuitry model of vulnerability and resiliency. Dysregulation of central stress response circuits have been implicated in the establishment of conditions as diverse as persistent pain, mood and personality disorders and substance abuse and dependence. Endogenous opioid system and A-opioid receptors contribute to the modulation and adaptation of the organism to challenges (e.g., sustained pain and negative emotional states) that threaten its internal

homeostasis. Data from animals and humans point to the endogenous opioid system as a critical modulator of the transition from acute (warning signals) to sustained (stressor) environmental adversity. Ruberio et al. suggested that the existence of pathways and regulatory mechanisms common to the regulation of both physical and emotional states transcend classical categorical disease classifications, and point to the need to utilize dimensional, symptom-related approximations to their study.

Tedeschi & Calhoun (1996, 2004); Tedeschi et al. (1998)

An emerging area of study and focus that has been prevalent with the literature is the ability to respond well to adversity, known as posttraumatic growth. Posttraumatic growth refers to reports of changes in individuals that occur due to attempts to cope with the aftermath of traumatic life events. According to Tedeschi and Calhoun (1996), resilient people have adjusted successfully despite adversity. People who experience posttraumatic growth are transformed by their struggles with adversity. The struggle in the aftermath of the trauma, not the trauma itself, produces the posttraumatic growth.

As it has been conceptualized, the process of posttraumatic growth (see Figure 4) is set in motion by a major life crisis that severely challenges and perhaps shatters the individual's understanding of the world and his or her place in it. Certain kinds of personal qualities, such as extraversion, openness to experience, and possibly optimism, may make growth a bit more likely. Initially, the individual must typically engage in coping responses needed to manage overwhelming emotions. Intense cognitive processing of the difficult circumstances also occurs. The degree to which the person is engaged cognitively by the crisis is a central element in the process of posttraumatic growth. The individual's social system may also play an important role in the general process of growth, particularly through the provision of new schemas related to growth, and the empathic acceptance of disclosures about the traumatic event and about growth-related themes. Posttraumatic growth seems closely connected to the development of general wisdom about life, and the development and modification of the individual's life narrative. The term posttraumatic growth appears to capture this phenomenon because it emphasizes transformative positive changes that (a) occur most distinctively in the aftermath of trauma rather than during lower level stress, (b) appear to go beyond illusion, (c) are experienced as an outcome rather than a coping mechanism, and (d) require a shattering of basic assumptions about one's life that traumas provide but lower level stress does not.

The kinds of positive changes individuals experience in struggles with the aftermath of trauma are reflected in a measure of posttraumatic growth, the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996). This measure was developed on the basis of interviews with many trauma survivors. It includes five

domains of posttraumatic growth, including improved relationships, new possibilities for life, a greater appreciation for life, a greater sense of personal strength, and spiritual development.

Research in posttraumatic growth has typically involved adults. Correlates of PTG have been identified, and support for Calhoun and Tedeschi's (1998) hypothesized model has been found for this process among adults (Calhoun & Tedeschi, 2001). Also, empirical research has indicated links between higher levels of PTG, quicker cortisol habituation (Epel et al., 1998), and lower psychological distress (Frazier et al., 2001; Park et al., 1996). However, this model has also sustained considerable criticism. Wortman (2004) suggests that despite Tedeschi & Calhoun's (2004) evidence of cognitive processing in posttraumatic growth, other studies have evidenced the opposite, that those who do best in the aftermath of adversity actually show little evidence of processing. In addition, it has also been argued that "reports of growth" are actually self-protecting illusions (Hoeksema & Davis, 2004; McFarland & Alvaro, 2000; Wortman, 2004). Indeed, even the correlations between higher posttraumatic growth and lower psychological distress have been debatable (Cordova et al., 2001; Powell et al., 2003). Given the amount of criticism this theory has sustained, it is clear that there is still considerable research to be done to disentangle and validate this concept.

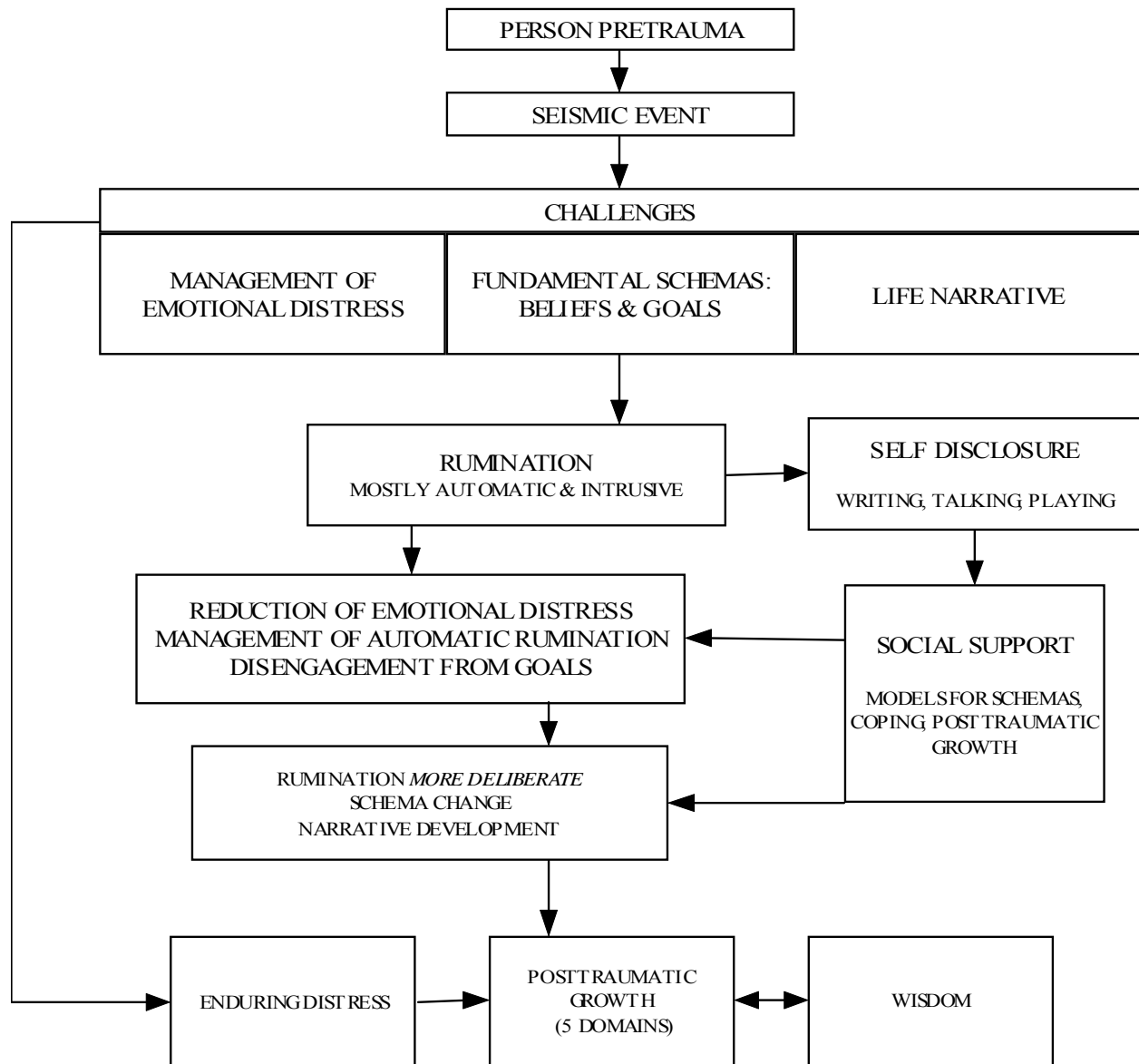


Figure 4. The process of posttraumatic growth. Adapted from Tedeschi & Calhoun, 2004.

Kobasa (1979, 1982), Maddi & Kobasa (1984)

One of the first, and, possibly most controversial, concepts within the resiliency literature is that of hardiness. Kobasa and colleagues were the first to introduce this construct and conceptualized it as a personal/individual difference variable that protects one against harmful effects of stress. According to theory, hardiness is a

general quality that emerges from rich, varied, and rewarding childhood experiences. Hardiness was conceptualized as comprising three interrelated dispositional tendencies: control, commitment, and challenge. A hardy person views potentially stressful situations as meaningful and interesting (commitment), sees stressors as changeable (control), and sees change as a normal aspect of life rather than a threat, and views change as an opportunity for growth (challenge). As a result, a hardy person is able to remain healthy under stress. Hardy people are thought to “transform the meaning of events to their most positive interpretations and ones that lead to goal-directed behavior” (Orr & Westman, 1990, p. 143).

More specifically, hardy individuals are thought to reframe their experiences such that (a) these are viewed in a positive light (e.g., as leading to benefits) and (b) they embrace meanings or perspectives which imply that something can be done to change a stressor or to recover from its detrimental effects. Rather than dwell on the negative outcomes of a traumatic event, hardy people may choose more than others to focus selectively on its positive effects. They may tend more than others to attribute positive effects to their traumatic experiences. Attribution of positive effects to traumatic events may facilitate recovery by helping to restore one’s belief in the benevolence of the world (Janoff-Bulman, 1992), by making senseless suffering meaningful (Frankl, 1978), or both. Hardy trauma victims may tend more than others to embrace cognitions which imply that there are actions one can take to foster recovery. They are thus more likely to engage in active coping behavior and less likely to respond in a passive, helpless manner. Non-hardy people, on the other hand, tend to focus on the negative meanings of events and are less likely to define problems in a manner that points to the possibility of finding a solution.

According to Maddi and Kobasa (1984), stressful events lead to a strain reaction or increased sympathetic arousal. Further, chronic strain may eventually lead to exhaustion, illness, or psychological distress. Hardiness modifies this strain-exhaustion process through several pathways. It alters perceptions of events to make them less stressful (Rhodewalt & Agustsdottir, 1984; Rhodewalt & Zone, 1989; Panaga, 1990; Weibe, 1991; Allred & Smith, 1989). It leads to active or “transformational” coping (Kobasa, 1982a; Bartone, 1989; Pierce & Molloy, 1990). It influences coping indirectly through its influence on social support (Kobasa & Puccetti, 1983; Ganellen & Blaney, 1984). Finally, it leads to change in health practices that in turn reduce illness (Contrada, 1989; Weibe, 1991; Wiebe and McCallum, 1986).

Factor analyses have confirmed the presence of the three proposed factors of control, commitment, and challenge in hardiness measures (Funk, 1992). However, there has not been as much support for the hierarchical structure (e.g., hardiness). This has lent to suggestions that hardiness, as a concept on its own, may not be as useful as its three subcomponents (Funk, 1992). In addition, there has been concern that hardiness scales actually measuring neuroticism; but, the magnitude of correlations

between the two have been moderate, indicating they are overlapping, but not identical.

Further criticisms of this theory have surrounded issues of lack of clarity regarding the mechanisms through which hardiness functions to protect. Kobasa is unclear on whether it is a buffer (moderator) between stressful life events and emotional responses to them or whether it provides both direct and indirect protections against psychological strain arising from stressful life events. In addition, in a thorough review of the hardiness literature, Funk (1992) criticized hardiness researchers due to failures he noted as, (1) a failure to adequately test the theory, (2) the concept has been poorly operationalized, (3) hardiness researchers should adopt a standard hardiness measure that has been originally developed to fit hardiness theory, and (4) more sophisticated statistical analyses should be used to test the theory, most only use simple correlations and discriminant analyses.

Joseph & Linley (2005)

A positive psychological theory of growth through adversity is proposed. The organismic valuing theory of growth through adversity posits an intrinsic motivation toward growth, showing how this leads to the states of intrusion and avoidance that are characteristic of cognitive–emotional processing after trauma. The theory posits 3 possible outcomes of this processing. First, experiences can be assimilated (i.e., return to pretrauma baseline). Second, experiences can be accommodated in a negative direction (i.e., psychopathology). Finally, experiences can be accommodated in a positive direction (i.e., growth). The theory shows how the organismic valuing process will automatically lead to the actualization of positive changes in psychological well-being, through the positive accommodation of the new trauma-related information, provided that the social environment is able to support this positive accommodation process.

The organismic valuing process theory posits that people are intrinsically motivated toward rebuilding their assumptive world in a direction consistent with new trauma-related information. This leads to greater psychological well-being, although it does not necessarily lead to greater subjective well-being. The theory holds that this occurs when the social environment is able to meet the individual's psychological needs for autonomy, competence, and relatedness, and the organismic valuing process is then promoted. The organismic valuing theory of growth through adversity is consistent with and integrates four salient theoretical themes.

First, the theory is consistent with the notion of an underlying completion tendency but extends this concept so that it is viewed as an expression of part of the tendency toward actualization. Organismic theory holds that it is human nature to

strive to integrate new experiences and to reorganize the self-structure accordingly, to modify existing models of the world to positively accommodate new trauma-related information. Adverse events show us that we are fragile, that the future is uncertain, and that what happens to us can be random. Because of these existential challenges, the organism strives to integrate the experience into the self-structure, which leads to the intrusive and avoidant states characteristic of PTSD. The phenomenology of PTSD, the states of intrusion and avoidance according to Horowitz (1982, 1986) and Janoff-Bulman (1992), are indicative of the need to cognitively and emotionally process the new trauma-related information. The person goes through a series of oscillating phases of intrusion and avoidance as the new trauma-related information is processed. This continues until a baseline is reached.

Second, the theory is consistent with the notion that accommodation rather than assimilation is necessary for growth. It further specifies that accommodation may occur either positively or negatively. When a baseline is reached, and intrusive and avoidant states are no longer present, this is explained as resulting from either cognitive assimilation of the traumatic memory or a revision of existing schemas to accommodate the new information. The person's natural tendency is to accommodate the traumatic information. However, this is challenging and requires a supportive social environmental context that facilitates satisfaction of the basic psychological needs for autonomy, competence, and relatedness. Given that these needs have been met in the past, they will act as factors of resiliency, then the organismic valuing process will be facilitated, and the person will tend toward positive accommodation of the traumatic material, that is, growth.

Third, the theory specifies how meaning as comprehensibility may characterize the initial struggle with meaning after trauma but that a shift to meaning as significance is necessary for growth. In the early stages following a traumatic event, there is a search for meaning (Thompson, 1985). As people deal with this information, they first seek to understand the event retrospectively (Wong & Weiner, 1981). When they have achieved this comprehensibility, they may assimilate or accommodate the information, as just described. However, if the organismic valuing process is given voice, and they are open to the existential issues raised by the event (Yalom & Lieberman, 1991), they will begin to search for meaning as significance. When accommodated positively, these questions of significance lead to growth as people reevaluate and more fully appreciate their relationships, their strength and resiliency, and their philosophy of life (e.g., "Bad things may happen at random, and therefore every day should be lived to the full in case it is my last").

Finally, the theory is first and foremost a theory of psychological well-being, and it demonstrates how growth through adversity may be viewed as but one pathway toward the development of psychological well-being in a fully functioning person. Positive accommodation of the traumatic material and development of meaning as significance may not make people "happier" in terms of their subjective well-being.

Indeed, a depressogenic reaction may be more realistic and appropriate. Growth may leave them sadder, but almost inevitably wiser (cf. Alloy & Abramson, 1979; Linley, 2003), in recognition of the vicissitudes of the human condition. The characteristics of growth are very much those of psychological well-being: closer relationships, greater self-acceptance, and deeper spirituality (cf. Ryff & Singer, 1996; van Dierendonck, 2004).

Further, individual differences in trauma response are explained within the organismic valuing theory of growth in terms of four factors. First, the degree of disparity between the trauma and preexisting expectations and beliefs is essential. The greater the incongruence and conflict between the person's previous assumptive world and the trauma-related information, the greater the potential for posttraumatic stress reactions and for growth. Second, whether the social environment has previously impeded or promoted the organismic valuing process will modify how the person responds to trauma. Organismic valuing process theory posits that the satisfaction of basic psychological needs of autonomy, competence, and relatedness is necessary for expression of the organismic valuing process. People who have experienced satisfaction of these needs earlier in life, during childhood and adolescence, will have developed generalized orientations of acting concordantly with their organismic valuing process. Third, the extent to which people act concordantly with their organismic valuing process will affect their process of response. Organismic valuing process theory posits that a social environment that is able to meet the individual's needs for autonomy, competence, and relatedness will lead to the occurrence of effortful appraisal processes, in turn facilitating positive accommodation and the search for meaning as significance. These processes will then lead to greater growth. Finally, whether the social environment impedes or promotes the organismic valuing process in the aftermath of the traumatic event will have an effect on the outcome of a person's organismic valuing process. The greater the psychological need satisfaction afforded by the posttrauma environment to people who are in a state of posttraumatic stress, the more likely they are to experience growth. This is the most recent theory presented in this section, and has yet to be empirically evaluated.

Rutter (1985, 1987, 1990)

Rutter (1987) made an important distinction between resiliency as a process or mechanism, versus a factor, trait, or variable: "The terms 'process' and 'mechanism' are preferable to 'variable' or 'factor,' because any one variable may act as a risk factor in one situation but as a vulnerability factor in another" (p. 317).

To this end, Rutter discusses the concept of mechanisms that protect people against the psychological risks associated with adversity in relation to four main processes. The first of these is reduction of risk impact. The impact may be reduced

by altering the appraisal of the risk factor or by altering exposure to the risk. In the former case, controlling exposure to the stress so that the individual can successfully cope with smaller doses of the experience may mitigate the meaning of the risk. Since the individual can cope successfully in some circumstances, the impact of the greater degree risk may be mitigated. Alternatively, a countervailing circumstance may mitigate the impact. If the experience or rejection, bereavement, or separation causes damage to self-esteem, the impact of that event may be neutralized by a new love relationship. Individuals who suffered some adversity in their home environments yet coped effectively may have experienced additional personal growth beyond that which characterized the young adults who came from more nurturing environments. The result also may be explained in the context of stress inoculation theory, whereby a psychological and physiological “toughening” occurs through exposure to moderate levels of stress (Rutter, 1987). Prior experience of stress during childhood and adolescence may in some cases increase resistance to more minor stresses, which could translate into lower levels of symptoms.

The second way in which risk impact may be mitigated is through mechanisms that change the child’s exposure to the risk situation. For example, the effect of association with delinquent peers on subsequent delinquent behaviour may be mitigated by parental supervision of the child in the environment characterized by high degrees of peer delinquency. Protection through alteration of the meaning of the risk also can occur through the “steeling” (Rutter, 1987, p. 326) qualities that result from successful coping. The second type of mechanism refers to the reduction of negative chain reactions that follow exposure to risk and perpetuate risk effects. For example, early parental loss may lead to greater probability of institutional treatment that has adverse effects on developmental outcomes. Adequate functioning of the remaining parent or the provision of alternative care arrangements may mitigate the impact of parental loss in producing this reaction.

The third mechanism through which protective functions may be served is through the establishment and maintenance of self-esteem and self-efficacy. Two types of experiences that are influential in the establishment of self-esteem and self-efficacy are the development of secure and harmonious love relationships, and opportunities for success in accomplishing tasks that are salient to the individuals. The resultant feeling of self-worth and self-efficacy provides the individual with confidence that he or she can successfully cope with the demands made upon the person. Secure and supportive personal relationships and successful task accomplishment are important to bolster positive concepts and self-worth.

Finally, protective factors operate through opportunities to obtain experiences that might mitigate the effect of early risk factors. Thus, delay of marriage may increase the range of opportunities available to an individual since it would not be required that the individual cease further education in order to work and support a spouse and family. In this regard, Rutter (1990) defined three broad variables as

protective factors: (1) personality coherence, (2) family cohesion, and (3) social support. Personality factors include level of autonomy, self-esteem and self-efficacy, good temperament, and positive social outlook. In addition, having more flexible thinking and expanded behavioral options as a result of positive affect may increase the personal resources of extraverted individuals during times of adversity. Furthermore, the tendency of extraverted individuals to build strong networks of social support may allow them access to this important protective factor during stressful situations (Rutter, 1985).

This theory has resulted in a great deal of research (e.g., PsycInfo search results in 496 citations of the 1987 article) and has been very positively regarded in the literature. No evidence of empirical validation, however, and no specific measures have resulted from this theory.

Summary

Several theories have attempted to elucidate resiliency factors, their inter-relationships, as well as their underlying mechanisms, processes, and outcomes. These theories have emerged from personality, cognitive, and biological orientations, yet none to date provide a comprehensive theory of resiliency. Although many of these theories (e.g., Richardson et al., 1990, 2002; Rutter, 1985, 1987, 1990) have received modest empirical investigations, findings from these studies are limited by various methodological shortcomings and in their generalizability. Resulting new theories in the future will need to use more sophisticated methodologies and measurement strategies, which can be validated across a range of populations (e.g., civilian and military).

Table 2. Summary of theories of resiliency, posttraumatic growth and hardiness.

Citation(s)	Construct	Theoretical Orientation	Process	Identified factors	Outcome (s)
Kobasa (1979, 1982), Maddi & Kobasa (1984)	Hardiness	Personality theory	Reframing of cognitions	Control, commitment, & challenge	Hardiness
Garmezy et al. (1984)	Resiliency	Cognitive	Neutralization of risk, enhancing adaptation, & protective functions of factors	Personality disposition, supportive family, & an external support system	Resiliency
Rutter (1985, 1987, 1990)	Resilience	Cognitive	Reduction of risk impact, mitigation of risk impact, establishment and maintenance of self-esteem & self-efficacy, & mitigation of early risk factors	Level of autonomy, self-esteem, self-efficacy, good temperament, positive social outlook, flexible thinking	Resilience
Richardson et al. (1990), Richardson (2002)	Metatheory of resilience and resiliency	Cognitive	Reintegration back to homeostasis	Coping abilities	Resilient reintegration, return to baseline homeostasis, recovery with loss, & dysfunctional reintegration
Deinstbier (1989)	Physiological toughness	Physiological	Stress induced physiological reactions	Low base rate SNS arousal, strong stress-induced SNS-adrenal-medullary arousal	Toughened neuroendocrine responses
Saakvitne et al. (1998)	Constructivist self-development theory	Cognitive	Integration of traumatic event, context and consequences into existing	Safety, trust, control, esteem, & intimacy	Posttraumatic growth

Citation(s)	Construct	Theoretical Orientation	Process	Identified factors	Outcome (s)
			beliefs about self and others		
Epel et al. (1998)	Physical thriving	Physiological/Cognitive	Characteristics of the stressor & psychological moderators affect stress reaction	Cortisol adaptation	Resiliency
Cicchetti & Lynch (1993)	Adaptation	Ecological-Transactional Model	Transaction between macrosystem, exosystem, microsystem, & ontogenic development	N/A	Adaptation the environment
O'Leary & Ickovics (1995)	Resilience	Cognitive	N/A	Hardiness, active coping, a sense of coherence, optimism, ability to find meaning in challenge	Survival, Recovery, Thriving
Rubiero et al. (in press)	Resilience	Neural Circuitry	Modulation of the endogenous opioid system and receptors	N/A	Resilience
Tedeschi & Calhoun (1996, 2004), Tedeschi et al. (1998)	Posttraumatic Growth	Cognitive	Rumination through self-disclosure to social supports resulting in schema change	Improved relationships, new possibilities for life, greater appreciation of life, greater sense of personal strength, spiritual development	Posttraumatic Growth
Joseph & Linley (2005)	Growth through adversity	Organismic-valuing theory	Cognitive-emotional processing	Personal schemas, social support	Growth through adversity

Review of empirical research on resiliency in protecting individuals from adverse outcomes associated with acute or chronic stress

The following sections review the research on risk-factors for stress-related psychopathology, along with the research on predictors of resiliency in the face of stress.

What is a Risk Factor?

Estimates suggest that about 40-60% of adults in the community have been exposed to trauma (Kessler et al., 1995; Yehuda & Wong, 2001), yet only a fraction of the general population develops PTSD (8%: American Psychiatric Association, 2000). This suggests that trauma alone is insufficient to cause PTSD; other vulnerability factors must be taken into consideration. One of the first steps in identifying vulnerability factors is to identify risk factors. The latter are variables that predict the development of PTSD. A risk factor need not play a causal role—it could simply be a correlate of a causal factor. To illustrate, wearing glasses is a statistical predictor of whether a person will develop osteoarthritis. Although wearing glasses could be regarded as a risk factor for this disease, it is not causative. Eyeglass-wearing is correlated with age—older people are more likely to wear corrective lenses than younger people—and age-related degenerative changes play a causal role in osteoarthritis. As this example shows, one should not confuse risk factors with causal factors, although the former can provide clues about the latter.

Low Resiliency: Risk Factors for Stress-Induced Psychopathology

One of the most widely-used ways of conceptualizing psychopathology is the diathesis-stress approach, where vulnerability factors for a given disorder (diathesis) interact with particular kinds of stressors to give rise to a disorder. In the following sections we will review the diathesis-stress research on the most widely investigated clinical conditions; somatic complaints and health anxiety, depression, panic disorder, and PTSD.

Somatic Complaints and Health Anxiety

Genetic factors

Stress is commonly associated with physical symptoms, such as headache, muscle pain, and gastrointestinal distress. Stress also is associated with heightened anxiety about these symptoms (i.e., health anxiety: Taylor & Asmundson, 2004). Twin research indicates that genetic factors make a modest contribution to somatic complaints and health anxiety, accounting for 10-40% of the variance in scores on these variables (Taylor et al., 2006). The remainder of the variance is due to environmental factors, such as early learning experiences concerning disease or death.

Experiences with disease and death

Health anxiety in adulthood is associated with a childhood history of severe diseases in oneself and in one's family members (Fritz & Williams, 1988; Robbins & Kirmayer, 1996). Childhood diseases—particularly those involving severe pain or discomfort—can induce fear of future disease. Hospitalization and separation from nurturing caregivers can add to the distress, particularly when the child is strongly attached to her or his caregiver.

The death of someone close to the person appears to sometimes precipitate hypochondriasis (APA, 2000). For example, the loss of a loved one in a road traffic collision may lead one to believe that life is fragile and that dangers are ever-present. In turn, this can lead to bodily preoccupation and worry about one's health.

According to retrospective reports from patients, a range of factors may be involved in the development of disease phobia, including the personal experience of disease or exposure to environmental toxins, or observations of family members grappling with illness (Malis et al., 2002; Marks, 1987). To illustrate, exposure to air pollution may fuel one's fear of eventually succumbing to emphysema, especially if the person believes that his or her lungs have been damaged by pollution.

In summary, various types of experiences with disease (in oneself or others) and experiences with the death of loved ones have been associated with health anxiety. A limitation of the research is that most studies have been based on retrospective reports, and so it is possible that health-anxious people are engaging in some sort of "effort after meaning" to make sense of their health anxiety. If stressful life experiences do play a role in severe health anxiety, then it would be important to determine whether the various classes of experience are specific or nonspecific in the development of health anxiety. Loss of a loved one, for instance, may be a nonspecific

factor, linked to hypochondriasis and other disorders (e.g., mood disorders). Childhood experiences with severe, painful diseases might be more specific to severe health anxiety.

Physical and sexual abuse

Various psychiatric populations, compared to normal controls, are associated with a heightened prevalence of childhood sexual abuse, physical abuse, and other sorts of stressful life events. Examples include panic disorder, hypochondriasis, bulimia nervosa, and borderline personality disorder (Paris, 1998; Taylor, 2000; Taylor & Asmundson, 2004). This suggests that stressors play, at most, a nonspecific role, possibly influencing the risk for later psychopathology.

Other stressors

The occurrence of stressful life events unrelated to disease or death (e.g., financial stressors) is also correlated with increased somatic complaints, health anxiety, and physician visits. These increases are disproportionate to actual medical morbidity (Kellner et al., 1983; Mechanic, 1978; Hankin & Oktay, 1979; Rahe & Arthur, 1978). Stressors can produce arousal-related bodily sensations, which some people misinterpret as indications of serious disease. People with hypochondriasis who spend large amounts of money on unnecessary medical tests may encounter financial problems as a result. Therefore, repeated testing can create stressors that give rise to anxiety-related bodily sensations, which, if misinterpreted as evidence of disease, will exacerbate health anxiety.

Stressful life events are insufficient on their own to lead to health anxiety because most people who experience these events don't develop severe health anxiety. A number of factors are probably involved. Various factors might have additive (incremental) or interactive effects on the risk for severe health anxiety. Particular disease-related beliefs may interact with particular (critical) events to give rise to, or exacerbate, health anxiety.

Parent-child interactions. Early learning experiences arising from particular patterns of parent-child interaction might predispose a person to develop excessive health anxiety as a child or later in life. Learning experiences may exert their effects by shaping health-related beliefs and coping behaviors. Several sorts of parent-child patterns have been studied:

- Parental modeling experiences, where the child observes that their parents are excused from home responsibilities or receive special attention when they are ill.
- Parental overprotection, in which parents treat the child as frail and vulnerable, thereby leading the child to believe that he or she is at risk for succumbing to illness.
- Parental reinforcement of illness behaviors, which occurs when a child often receives toys, food treats, attention, sympathy, or special care, or is excused from school or home chores when ill.

Most retrospective studies suggest that severe health anxiety in adulthood is associated with childhood exposure to these parental patterns (Baker & Merskey, 1982; Bianchi, 1971; Parker & Lipscombe, 1980; Schwartz et al., 1994; Watt & Stewart, 2000; Whitehead et al., 1981, 1986, 1994; but cf. Barsky et al., 1994b; Mabe et al., 1988). Consistent with importance of parental modeling, prospective (longitudinal) studies have found that parental ill health is correlated with medically unexplained symptoms in offspring during childhood and adulthood (Craig et al., 1993; Hotopf et al., 1999; Mechanic, 1980).

The three parent-child interaction patterns may contribute to different aspects of health anxiety. Parental modeling may contribute to beliefs that disease is important and not to be ignored, thereby leading to bodily preoccupation in the child. Parental modeling may also lead the child to vicariously acquire health worries. Parental overprotection may lead the child to fear that he or she is vulnerable, and that diseases are highly dangerous.

Parental reinforcement impresses upon the child the importance of symptoms by adding a desirable (rewarding) component to being sick, such as exemption from chores and other responsibilities (Parsons, 1951). A further reward is that illness provides a ready excuse for poor performance or failure (e.g., poor performance in an exam). Health-anxious people may use this face-saving strategy if they believe that disease is a legitimate excuse (Smith et al., 1983). Thus, learning experiences that teach the child that being sick is “rewarding” can perpetuate excessive health anxiety, because the child gains rewards by remaining health anxious, and loses rewards if he or she attempts to overcome the anxiety. This does not mean that health-anxious people are feigning or malingering. The incentives may simply encourage somatic preoccupation in people who are already genuinely worried that they have some serious disease. The incentives probably don’t play a major role in health anxiety, because reinforcement of the sick role is not always correlated with the severity of health anxiety (Ferguson, 1998; Stone & Neale, 1981).

Although the available research suggests that parent-child interactions may be important in the development of severe health anxiety, we are not advocating a “blame your parents” model of health anxiety. It is unhelpful for health-anxious

people to blame others (or themselves) for their problems. Parents learn their parenting styles from a variety of sources, including their own experiences during childhood. Parental overprotection and reinforcement may arise because these patterns are reinforcing to both the parent and child; parents feel they are providing good care, and children feel cared for. It can be difficult for parents to foresee the long-term consequences of well-intentioned actions. And, not all children become health-anxious as a result of parental overprotection, reinforcement, or modeling. Parent-child patterns are but one element in the matrix of factors involved in the etiology of severe health anxiety.

Depression

Stressful life events, such as those related to some kind of loss (e.g., loss of a job or death of a significant others), combined with low social support, have long been known to increase the risk for mood disorders, such as major depressive disorder (e.g., Brown & Harris, 1978; Denny et al., 2004; Kalil et al., 2001). Stressors combined with low social support do not inevitably lead to depression; they are thought to trigger depression in people with some kind of preexisting vulnerability, such as a lack of social support, preexisting dysfunctional beliefs or cognitive style (e.g., pessimistic attributional style), or genetic factors.

Cognitive and personality risk factors

Longitudinal research indicates that non-depressive people who have pessimistic cognitive style, and people who are better able to recall aversive than pleasant memories, are at greater risk for subsequently becoming depressed (e.g., Alloy et al., 1999; Gotlib & Neubauer, 2000). Personality traits such as neuroticism (i.e., the tendency to experience negative emotions in response to stress) and “stress reactivity” (i.e., a trait similar to neuroticism) have also been found to predict the development of depression (Riso et al., 2002). The development of chronic depression may involve increased levels of childhood adversity, protracted environmental stress, and heightened stress reactivity (Riso et al., 2002).

Genetic factors

The serotonin system has been implicated in the etiology of many disorders, particularly mood disorders. A component of this system, the serotonin transporter, plays an important role in serotonergic neurotransmission by facilitating the reuptake of serotonin from the synaptic cleft. The short polymorphism (i.e., variant) of a promoter region of the serotonin transporter gene (5HTTLPR), compared to the long

variant, is associated with an almost 50% reduction in serotonin reuptake, resulting in increased synaptic concentrations of serotonin (Heinz et al., 2000; Lesch et al., 1996). There is some evidence that people possessing one or more copies of the short allele are more prone to anxiety and mood disorders (Caspi et al., 2003; Collier et al., 1996; Lesch & Mossner, 1998).

To illustrate these findings, Caspi et al. (2003) compared the response to stress of people with short or long alleles in 5HTTLPR. People with one or two copies of the short allele, compared to people who had only the long allele, had more depressive symptoms, diagnosable depression, and suicidal behavior in response to childhood maltreatment. In the absence of childhood maltreatment, there was no difference in the prevalence of depression between people with short or long alleles. This suggests that people with the short allele were particularly vulnerable to depression when stressors occurred. These findings replicated animal studies showing that organisms with two long alleles cope better with stress (Holden, 2003).

Panic Disorder

Anxiety sensitivity

The concept of anxiety sensitivity has proved valuable for understanding the risk factors for stress-related panic attacks and panic disorder (Taylor, 1999, 2000). Many people find arousal-related sensations to be aversive. Yet people differ – sometimes markedly – in the extent to which they are frightened by these sensations. Anxiety sensitivity (Reiss & McNally, 1985) is the fear of arousal-related sensations, which arises from beliefs about the consequences of these sensations. “Arousal-related” refers to all sensations associated with autonomic arousal, including palpitations, paresthesias, dyspnea, chest tightness or pain, faintness, and sweating. These sensations occur during states of anxious arousal and also arise from other sources, such as physical illness and ingestion of particular substances (e.g., caffeine). The term “arousal sensitivity” would be a better term to describe the fear of these sensations. However, the term “anxiety sensitivity” will be retained because it is widely used.

People with low anxiety sensitivity believe that arousal-related sensations are unpleasant but harmless, with no important consequences. People with high anxiety sensitivity have catastrophic arousal beliefs. They believe that arousal-related sensations lead to very harmful and possibly disastrous consequences, such as death, insanity, or social ostracism. People with high anxiety sensitivity are frightened that palpitations will lead to cardiac arrest. Derealization is feared because it is believed to lead to insanity or loss of behavioural control. Trembling is feared because the

person believes it will lead to ridicule or rejection. People with high anxiety sensitivity strive to avoid situations or activities that evoke these sensations. They also tend to be hypervigilant to arousal related body sensations, and spend more time focusing on their bodies (Schmidt et al., 1997b).

Anxiety sensitivity is an individual difference variable that remains stable over time, at least in the absence of panic treatment (Maller & Reiss, 1992). Anxiety sensitivity appears to contribute to the development and exacerbation of many phobias and other anxiety reactions, but appears to play an especially important role in panic disorder (Reiss, 1991; Taylor, 1999). The way that anxiety sensitivity exacerbates or amplifies anxiety reactions can be seen in the following example. Consider a highly anxiety sensitive person who has a fear of driving through tunnels. While travelling through a tunnel, the person becomes anxious, and then becomes anxious about being anxious. Thus, anxiety is amplified by high anxiety sensitivity, sometimes to the point of panic.

Longitudinal studies of anxiety sensitivity and panic

A number of longitudinal studies using a measure of anxiety, called the Anxiety Sensitivity Index (ASI; Peterson & Reiss, 1992), have shown that anxiety sensitivity predicts who will develop panic attacks, including the unexpected panic attacks that characterize panic disorder (Ehlers, 1995; Harrington et al., 1996; Maller & Reiss, 1992; Schmidt, 1999; Telch, 1997). Two of largest studies were conducted by Schmidt and colleagues. In their first study, Schmidt et al. (1997a) administered the ASI and other measures to over 1,400 cadets about to undergo five weeks of military basic training in the US Air Force. A purpose of basic training is to teach cadets to deal with demanding, unpredictable, and uncontrollable stressors. Cadets are not given schedules and have no access to clocks or wrist watches. They are unable predict whether their next activity will be an academic evaluation, a military exercise, or a 5-mile run. New stressors are continually introduced to ensure that each cadet is overtaxed.

Schmidt and colleagues assessed whether or not the cadets had panic attacks during basic training. It was found that anxiety sensitivity (assessed prior to basic training) predicted the occurrence of unexpected panic attacks, even after controlling for trait anxiety and history of panic attacks. Anxiety sensitivity also predicted other anxiety symptoms, along with functional impairment created by anxiety and disability. Schmidt (1999) replicated these findings on another sample of over 1,000 cadets.

These findings show that anxiety sensitivity predicts vulnerability to have panic attacks even people who have never before had a panic attack. The results show that we can estimate a person's vulnerability to panic simply by finding out about

their fear of arousal-related sensations, or more directly, by assessing their beliefs about these sensations.

Posttraumatic Stress Disorder

Classes of risk factors

There have been many studies of PTSD risk factors. The results have been synthesized in two major meta-analyses (Brewin et al., 2000; Ozer et al., 2003). Four categories of predictors were examined: (1) historical features such as family psychiatric history, low intelligence, family instability, or past history of trauma (i.e., traumata arising prior to the index trauma associated with the current episode of PTSD); (2) severity of the index trauma; (3) psychological processes during and immediately after the trauma; and (4) life stressors and low social support after the trauma. In both meta-analyses variables from all four categories were significant predictors of PTSD. Factors closer in time to the traumatic event (proximal factors; e.g., trauma severity) were stronger predictors than historical features (distal factors). The strongest predictor, investigated only in the Ozer et al. (2003) meta-analysis, was peritraumatic dissociation. That is, the experience of dissociative symptoms during or immediately after the trauma (e.g., the sense that time has slowed down, perceiving one's environment to be unreal, or feeling that one is observing the event unfolding, as if watching a movie). Although the various predictors were statistically significant, the effect sizes were not generally large; none of the risk factors were necessary or sufficient for developing PTSD (Ozer & Weiss, 2004).

Many of the risk factors for PTSD in children are similar to those for adults, including the level of exposure, extent of disruption of social support systems, and pretrauma levels of psychopathology (Caffo & Belaise, 2003). Parental distress and psychopathology are predictors of childhood PTSD (Davis et al., 2000). Parental modeling might play a role, especially for a traumatic event that has struck the whole family. Children who observe that their parents are highly distressed by the event may be more likely to be distressed themselves. Consistent with this, persistent maternal preoccupation with the trauma and other trauma-related family disruptions have been found to predict PTSD in children (Pynoos & Nader, 1993). Persistent maternal separation from parents immediately after a natural disaster (such as a hurricane), along with the loss of the child's homes, pets, toys, and friends also has been found to predict PTSD in children (Pynoos & Nader, 1993; Vernberg et al., 1996). PTSD symptoms in children also can develop as a result of witnessing episodes of inter-parental violence (Rossman & Ho, 2000).

The burden of accumulated adversity

Cumulative exposure to traumata in disaster workers, for example, increases the risk of PTSD (Fullerton et al., 2004). Exposure to lesser stressors before or after the traumatic event can also add to the burden of accumulative adversity (Alonzo, 1999). To illustrate, for both female and male soldiers, sexual harassment and racial discrimination have also been found to serve as incremental risk factors for PTSD (Fontana et al., 2000; Loo et al., 2001). That is, the more stressful and less supportive the context, the greater the likelihood that a traumatic stressor will give rise to PTSD.

Stressors may be linked in a cascading fashion, where the traumatic event is followed by stressful sequelae. Thus, the trauma does not necessarily stop with the end of the most dramatic part of the event. There is no end of examples. A rape victim may believe that the sexual assault was the worst part of her experience, but then encounter a nightmarish coda where police, lawyers, parents, or friends accuse her of lying about the sexual assault, or even wanting it to occur. In cases of childhood sexual abuse, the associated stressors can include disclosure and the aftermath, such as disclosure-related family disruptions (e.g., the removal of children by social workers) and the denial of the abuse by the perpetrators. A survivor of a horrific road traffic collision may discover that the worst part of the ordeal is the way that she is treated in the hospital emergency room, where she lies cold and naked on a hospital gurney, awaiting some unknown surgical intervention but not knowing the nature or severity of his injuries (Koch & Taylor, 1995). A factory worker may lose an arm in a freakish industrial accident and then have to endure insurance or worker's compensation hearings in which he is told that it was his own fault. A survivor of torture or genocide may be confronted with government officials who deny that the atrocities ever happened. An adolescent burn victim may be mortified to find that she is teased (e.g., called "Scarface") and shunned when she returns to school. These are all examples of trauma sequelae, which can be even more disturbing than the actual traumatic event (e.g., Koch & Taylor, 1995; Taylor & Koch, 1995).

Does low intelligence cause PTSD?

Many authors have speculated about the meaning of various risk factors. Among the most controversial are the intelligence findings, in which lower premorbid IQ has been shown to predict higher risk for combat-related PTSD, even after controlling for trauma severity (e.g., Macklin et al., 1998). It has been speculated that intelligence is negatively correlated with later PTSD because people with high intelligence are likely to have more intellectual resources for coping with trauma and associated symptoms. However, alternative explanations are equally likely. For example, scores on intelligence tests are influenced by one's educational attainment (i.e., crystallized intelligence). Therefore, factors influencing educational attainment

will influence IQ scores. Antisocial personality traits (e.g., a history of conduct disorder) is associated with poor school performance (e.g., due to truancy), which, in turn, can influence scores in intelligence tests. Thus, intelligence per se may not cause PTSD; the causal variable for both intelligence and PTSD could be antisocial personality traits.

Premorbid personality

Antisocial traits also predict trauma exposure; people who engage in aggressive or illegal activities (e.g., car theft, gang involvement) are more likely to be exposed to trauma (Beslau et al., 1991, 1995; Jang et al., 2003; King et al., 1996; Miller et al., 2003). Those traits may not be a sufficient cause of PTSD; emotional vulnerability factors such as a preexisting proneness to readily experience negative emotions (as indicated by high scores on personality dimensions of Neuroticism or Negative Emotionality) also predict PTSD, and may combine with antisocial traits to increase the overall risk of developing this disorder.

Peritraumatic dissociation and acute stress disorder

Peritraumatic dissociation is a major feature of acute stress disorder (ASD), and is risk factors for PTSD. But according to Harvey and Bryant, “there is little justification for the ASD diagnosis in its present form” (2002, p. 886). A major rationale for the diagnostic category of ASD was the view that peritraumatic dissociation is a critical factor in the development of PTSD (van der Kolk & van der Hart, 1989). However, research shows that many people who do not have peritraumatic dissociation go on to develop PTSD, and that people may have peritraumatic dissociation without developing PTSD (Harvey & Bryant, 2002; McNally, 2003; Morgan et al., 2001). Moreover, although the occurrence of peritraumatic dissociation is associated with an increased risk of developing PTSD, this does not mean that dissociation plays a causal role. There are other peritraumatic symptoms, which tend to be correlated with dissociation, that play an equally important, if not more important, role in predicting PTSD. Peritraumatic hyperarousal as well as reexperiencing and avoidance symptoms arising shortly after the trauma all predict the subsequent development of PTSD, with either no difference in their predictive power, or inconsistent findings about which is the strongest predictor (e.g., Brewin et al., 1999; Creamer et al., in press; Harvey & Bryant, 2002; Marshall & Schell, 2002; Southwick et al., 1993; Zoellner et al., 2003); “simply put, the best predictor of future PTSD symptom severity is initial symptomatic distress” (Marshall & Schell, 2002, pp. 633-634). If the concept of ASD is abandoned, then dissociative or PTSD symptoms arising during or within the first few weeks of trauma exposure

could be used not to define a disorder but simply to identify factors that indicate that the person has an increased risk for developing PTSD.

Post-trauma social support

Two types of post-trauma social support have been found to be correlated with a reduced risk for PTSD; structural social support (defined as the size and complexity of one's social network) and functional social support (defined as perceived emotional sustenance and instrumental assistance) (King et al., 1998).

Although social support is a statistical predictor of reduced risk for PTSD, the nature of the causal links remain to be elucidated. Both could simply be the produce of pre-trauma factors; for example, people who are not prone to negative emotions (e.g., those with low scores on Neuroticism) may have better social support, because they are more likely to enjoy being with people, and people are likely to find them more enjoyable, compared to people who tend to frequently experience negative emotions such as sadness or irritability. Thus, low Neuroticism could cause both high social support and reduced risk for PTSD.

Other links are also possible. Social support might directly reduce the risk for PTSD because social support provides the trauma survivor with (1) resources for emotion-focused coping (e.g., sympathetic others who may organize activities that help reduce the person's hyperarousal symptoms), and (2) cognitive resources that may provide corrective information (e.g., the presence of reliable, trustworthy others may serve to counter the trauma survivor's beliefs that the world is dangerous or that people are malevolent). It is also possible that PTSD could directly erode social support; trauma-related avoidance could extent to interpersonal avoidance, hyperarousal symptoms (especially irritability) and numbing symptoms (especially feelings of estrangement from others) could damage interpersonal relations.

Interactions among factors

There are likely to be direct and indirect pathways through which risk and resiliency factors influence PTSD (King et al., 2004). This matrix of factors is illustrated in the Figures below, which show the results of structural equation modeling of PTSD risk and resiliency factors for combat veterans (King et al., 1998).

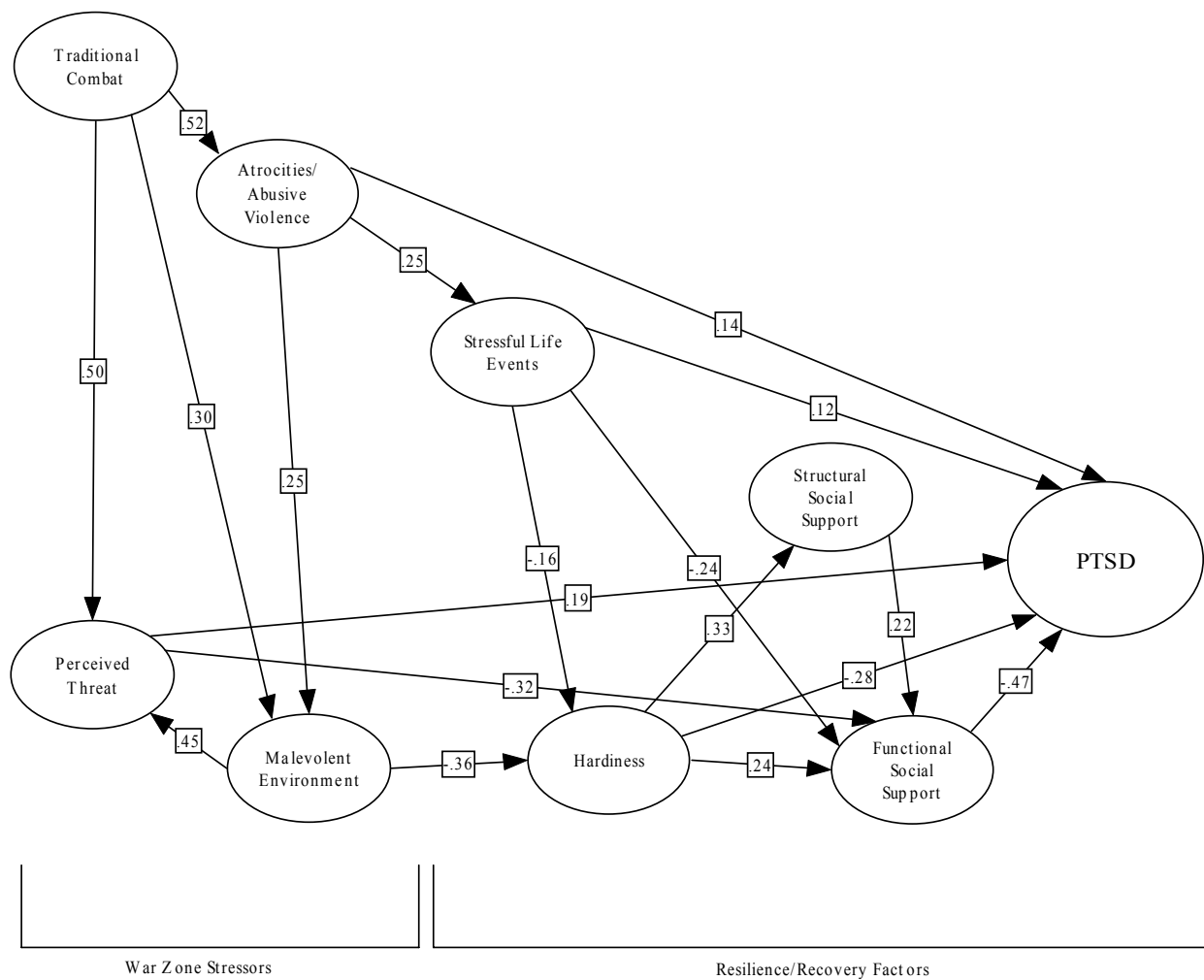


Figure 5. Risk and resiliency factors for PTSD for combat-exposed female soldiers. (From King et al., 1998).

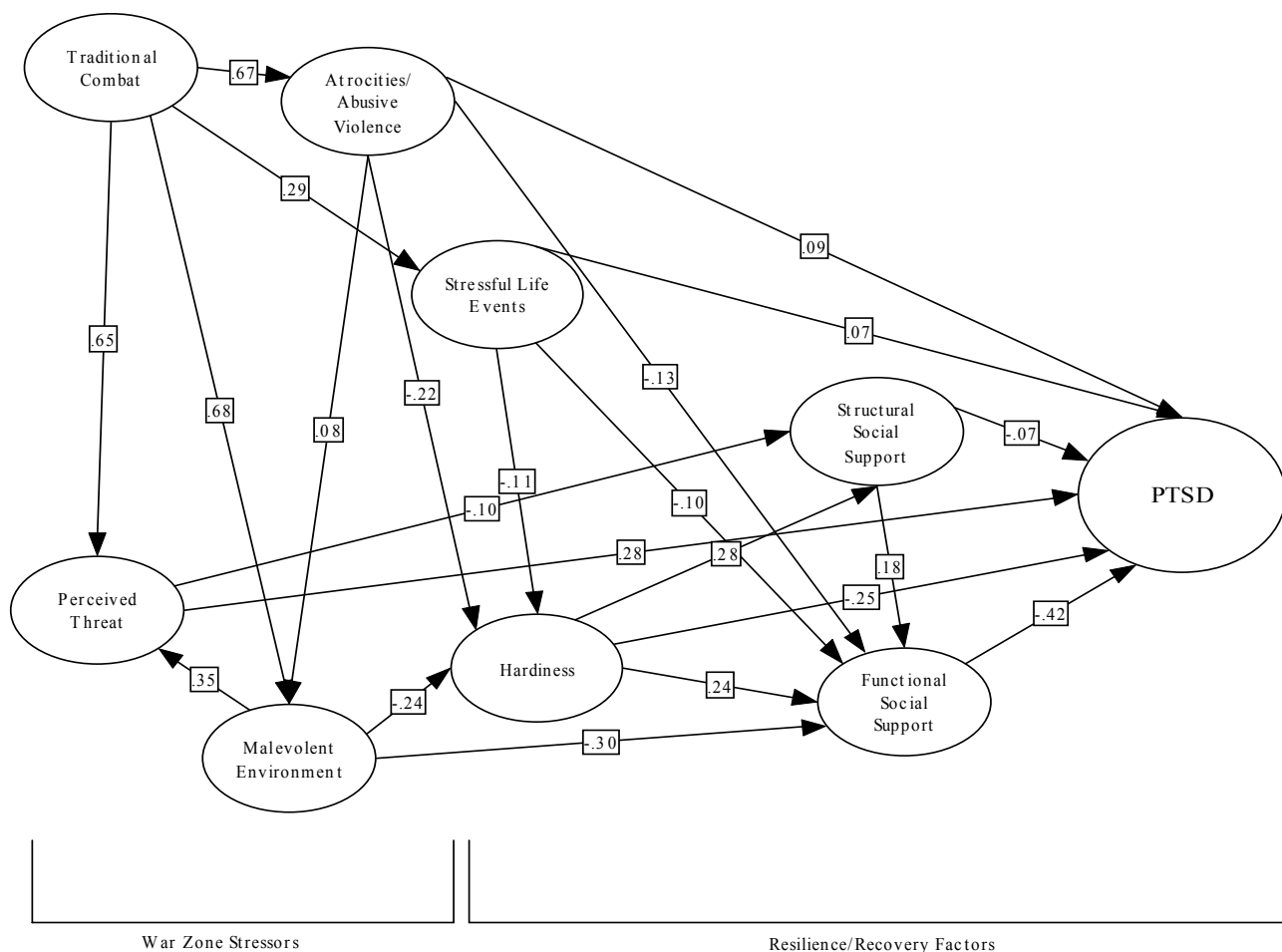


Figure 6. Risk and resiliency factors for PTSD for combat-exposed male soldiers. (From King et al., 1998.)

Mechanisms of Resiliency and Risk

The preceding section summarized a number of risk factors associated with PTSD and hypothesized causal models. However, this research does not directly address the issues of why and how these risk factors are implicated in PTSD. For example, why is depression a risk factor and not some other psychiatric condition, such as schizophrenia? How does level of parental warmth mediate the effect of stressors or enhance resiliency and recovery? Similarly, how do the genetic factors that control neurotransmitter function (e.g., serotonin transport or reuptake) moderate susceptibility to PTSD or the effect of stressors or enhance resiliency and recovery? Simply put, a great deal of the research has been successful in identifying factors

associated with PTSD, but little research has examined the mechanisms behind these associations. Understanding why and how stressors or resiliency factors and PTSD are linked is key to managing the disorder.

This research is in its infancy and much of the current impetus comes from the field of behavioural genetics. This is an area of research that is concerned with how individual differences in behaviour are caused by genetic and environmental factors and their interaction (see Jang, 2005). We begin by exploring why any two measured variables are related. For example, personality traits are considered to be a risk factor for PTSD. Behavioural genetic methods test if the observed relationship is attributable to the fact that both share a common genetic and environmental basis.

Concept of Genetic and Environmental Correlations

Consider the following equation:

$$r_{x,y} = (h_x \cdot h_y \cdot r_G) + (e_x \cdot e_y \cdot r_E) \quad \text{Equation 1}$$

This expression states that the observed, or phenotypic relationship between two measured variables X and Y, indexed by the correlation coefficient, $r_{x,y}$, is a direct function of the degree to which genetic factors, symbolized by h (h_x , h_y) and environmental factors, symbolized by e (e_x , e_y) influence X and Y respectively, weighted by the degree to which the genetic and environmental influences on X and Y stem from a common source, indexed by the genetic and environmental correlation coefficients r_G and r_E , respectively.

These correlation coefficients vary between -1.0 and $+1.0$ and are interpreted like any other correlation coefficient. A positive value of r_G suggests that the genetic factors that increase scores on X (e.g., dopamine reception) also cause an increase on Y. If the value is negative, this indicates that the genes that increase scores on X, *decrease* scores on Y. A value of $r_G = 0.0$ indicates that the variability in X and Y symptoms comes from different genes. The environmental correlation is interpreted the same way.

The importance of the behavioural genetic approach to studying risk and resiliency is that although it may appear that two variables are unrelated (e.g., $r_{x,y}$ is low, $< .30$), by going beyond this observed relationship it is possible to find that they are indeed related - when r_G between X and Y is high and positive but r_E is high and negative. The net result on $r_{x,y}$ would be a value near zero, or quite low, erroneously suggesting that little relationship exists between the disorders. In this way, important relationships are not overlooked.

The terms in Equation 1 are estimated by comparing the magnitude of the similarities and differences between kinds of relatives, such as twins who share genes to known different degrees. The comparison of the similarities of raised together identical or monozygotic (MZ) pairs to fraternal or dizygotic (DZ) pairs is one of the most commonly used designs. In this design, a higher within-pair MZ similarities, indexed by the correlation coefficient ($r_{MZ\ TWIN1.TWIN2}$) is compared to a within-pair DZ correlation ($r_{DZ\ TWIN1.TWIN2}$) suggests that genetic influences are implicated because MZ twins share all of their genes whereas DZ twins share approximately half. When $r_{MZ\ TWIN1.TWIN2} = r_{DZ\ TWIN1.TWIN2}$, no genetic influences are inferred because despite the two-fold greater genetic similarity of MZ twins, their observed similarity is that of DZ twins. The logic behind the estimation of r_G and r_E is similar but is based on comparing MZ to DZ twin cross-correlations. A twin cross correlation is computed by taking the first twin's score on variable X and correlating it with the second twin's score on variable Y. Next, the second twin's score on X is correlated with first twin's score on Y and the two cross-correlations correlations are then averaged. These average twin cross correlations are computed on samples of MZ and DZ twins and compared. If the MZ cross correlation exceeds the DZ cross-correlation, then a non-zero value of r_G is indicated. The actual procedures used to estimate the quantities in Equation 1 are explained in detail in many behavioral genetic textbooks (e.g., Jang, 2005; Neale & Cardon, 1992; Plomin, DeFries, McClearn, & Rutter, 1997) and the details need not be repeated here.

Just as genetic effects can be estimated, twin data also allow the direct estimation of two basic forms of environmental effect. The first is the family environment that affects all family members the same way (indexed by c^2) or has the same influence on two variables (r_C). A frequently used example of c^2 is socioeconomic status because it is thought to apply and affect each person within the family the same way, but also differentiates one family from another. The second major environmental effect is the nonshared family environment (e^2 and r_E). Nonshared environmental influences are defined as any experience, milieu, or circumstance – virtually anything that causes children from the same family to be different from one another. They are not just random events, but experiences that systematically differentiate people from one another (e.g., parental favouritism).

From a behavioural genetic perspective, the first step to testing the validity of the risk/resiliency model is to show that PTSD and personality share a common aetiological basis. Beginning at the level of the phenotype, Koenen et al. (2002) reported that preexisting conduct disorder in males, which is considered an early manifestation of antisocial personality, was a risk factor for both trauma exposure and subsequent PTSD symptoms using data from veterans of the Vietnam War. Behavioural genetic methods can test this observed relationship, but also, tell us why personality increases risk to develop PTSD.

Studies of twins who were Vietnam veterans have estimated the heritability (h^2)

of DSM-III and DSM-III-R PTSD symptoms (e.g., traumatic events are persistently re-experienced, persistent avoidance of stimuli associated with trauma or numbing of general responsiveness, persistent symptoms of increased arousal) to range from 32% - 45% (True et al., 1993). Moreover, these estimates did not vary when the sample was split into groups of twins who had served in Southeast Asia and those who had not. This suggests that PTSD is not a disorder solely associated with military service (e.g., combat). As such, any form of assault, natural disaster, car accident or negative significant life event can also trigger symptoms of PTSD. This was confirmed by a study by Stein et al. (2002) who surveyed 222 MZ and 184 DZ general population twin pairs recruited from Canada on lifetime exposure to traumatic events and their characteristic responses. The twins were asked to report their experiences on several classes of traumatic events that ranged from sexual assault to car accidents to the death of a close family member or friend. None of the twins had been in combat but 75.4% of the total sample had experienced one or more of the other events. These twins were surveyed on DSM-IV PTSD cluster B through D symptoms and similar to the study of combat veterans above, the heritability of symptoms was: re-experiencing (36%), avoidance (28%), numbing (36%), and hyperarousal (29%).

Moreover, this study also found that exposure to traumatic events has a heritable basis which tests if genes might be controlling the exposure to specific kinds of traumatic events. This is a key point in testing a risk model. Traumatic events were factor analyzed yielding two factors. The first described “assaultive events” (robbery; held captive; beat up; sexual assault; other life threat) and the second “non-assaultive events” (sudden family death; motor vehicle accident; fire; and tornado, flood, or earthquake). The heritability of assaultive trauma exposure (using data from all subjects; that is, whether or not any trauma was experienced) was $h^2 = 20.3\%$, $c^2 = 21.3\%$ and $e^2 = 58.4\%$. In contrast, a purely environmental model provided the best explanation of liability of exposure to non-assaultive trauma: $c^2 = 38.6\%$ and $e^2 = 61.5\%$. It was also found that PTSD symptoms and the experience of assaultive trauma was inextricably linked by a common set of genetic factors; the r_G 's between exposure to assaultive trauma and PTSD symptoms ranged from 0.71 - 0.83.

The significance in finding that exposure to traumatic events is under partial genetic control is that it suggests that an event per se is heritable. However, what is more likely to be inherited are factors that influence the person's risk for placing oneself in, or creating, potentially hazardous situations – such as genetically based personality traits that work to select specific environments for the expression of these genes. Thus, the genes underlying exposure to events and PTSD might be actually be personality genes, and possessing these genes thus increase the liability to PTSD. This mechanism has been called gene-environment correlation in which genetically influenced factors (such as personality) influence the probability of exposure to adverse events critical to the development of specific psychopathologies.

In the case of PTSD, evidence for such a role for personality was confirmed in Jang et al. (2003) who found significant genetic correlations between assaultive trauma and the personality variables juvenile antisocial behaviour ($r_G = .22$), self-damaging acts ($r_G = .24$), NEO-FFI Openness to Experience ($r_G = .14$) and EPQ-R Psychoticism ($r_G = .36$) suggesting that personality traits increase the risk for developing PTSD by placing individuals in higher-risk situations. Other examples include Saudino et al. (1997) paper that showed that all genetic variance on controllable, desirable, and undesirable life events in women was common to the genetic influences underlying EPQ Neuroticism and Extraversion and NEO-FFI Openness to Experience. The genetic basis to personality has also been shown to influence family environment. For example, Jang et al. (2000) estimated the genetic correlation between the Family Environment Scale (FES: Moos and Moos, 1974) and a measure of traits delineating personality function. Relationships were found between FES family cohesiveness and emotional liability ($r_G = -.45$) and inhibition ($r_G = -.39$); FES achievement orientation of the family and antisocial behaviour ($r_G = .38$) and also inhibition ($r_G = -.58$); and finally, FES intellectual-cultural orientation and inhibition at $r_G = -.38$. In short, the broad phenomenon of gene-environment correlation suggests that genetically-based personality factors influence the probability of exposure to adverse events which increases the risk for the development of a disorder. Similar analyses, using other risk or resiliency factors, like depression could also be conducted.

Gene-environment interactions

Another important mechanism underlying risk and resiliency is the gene-environment interaction (GxE: Plomin, DeFries & Loehlin, 1977). This is a phenomenon by which environmental conditions moderate genetic variability. Using the previous example, showing how environmental conditions (that may have been shaped by personality factors by the mechanism of gene-environment correlation) do indeed cause the onset of another disorder (e.g., PTSD symptoms).

In the behavioural genetic literature, GxE is demonstrated when individuals who possess a specific genetic polymorphism (a particular form of a gene implicated in a particular disorder) and have been exposed to specific environmental conditions (e.g., subjected to high levels of parental mistreatment) develop a disorder compared to individuals who possess just the polymorphism or have only been exposed to the salient environmental conditions. Within heritability studies, the gene-environment interactions are suggested when estimates of h^2 , c^2 and e^2 are shown to vary over different levels of environmental condition. In addition to gene-environment interaction, behaviour geneticists discuss environment-environment interaction or experience by environment interaction. An example of experience by environmental interaction is the finding that some people can live in the most adverse conditions

(e.g., extreme poverty) but display no ill effects because the presence of another environmental factor, such as a caring mother that attends to the emotional needs of a child, cancels out the influence of poverty.

One of the most dramatic examples of gene-environment interaction is Caspi and colleagues (2002) study of the development of antisocial behaviour. As clinical research has identified one of the major risk factors for the development of antisocial behaviour in boys is abuse as a child, such as erratic, coercive, and punitive parenting and that the risk for conduct disorder increases the earlier the abuse begins. As noted earlier, there is little 1 to 1 correspondence between environmental conditions and the development of the disorder and the deciding factor is whether or not the child has inherited the genetic liability for the disorder. In the case of antisocial behaviour, the monoamine oxidase A gene (MAOA gene Xp11.23-11.4) was selected because it has been associated with aggressive behaviour in mice and in some studies of human. Their sample consisted of 1037 children who had been assessed at 9 different ages for levels of maltreatment (no maltreatment, probable maltreatment and severe maltreatment) and MAOA activity (low activity, high activity). They found that the effect of maltreatment was significantly weaker among males with high MAOA activity than among males with low MAOA activity. Moreover, the probable and high maltreatment group did not differ in MAOA activity indicating that the genotype did not influence exposure to maltreatment. These results demonstrate that the MAOA gene modifies the influence of maltreatment.

Depression is another excellent example of a complex trait for which gene-environment interactions are likely to be important. Eley and colleagues (2004) reported results from a study of gene-environment interaction in adolescent depression. The group sampled individuals with depression symptoms in the top or bottom 15% and divided them into high or low environmental risks groups, which were family-based. Family-based risks include parental psychopathology, social adversity factors such as poverty or low socio-economic status (SES) and family-based stressful life events. DNA was obtained from 377 adolescents and markers within, or close to, each of the serotonergic genes; 5HTT, HTR2A, HTR2C, MAOA, and tryptophan hydroxylase (TPH) were genotyped. A significant genotype-environmental risk interaction was found for 4HTTLPR in female subjects only, reaffirming the notion that an important source of genetic heterogeneity is exposure to environmental risk.

These approaches are tests of genotype-environment interaction and require that an actual loci is tested. In most cases with psychiatric disorders, few specific genes, if any, have been reliably implicated in a disorder or are candidates in many different disorders. Another approach for finding evidence of gene-environment interaction uses a classic twin study methodology to test if h^2 varies over levels of environmental conditions (e.g., Dick et al, 2001). This approach was used by Jang et al (in press) to test if the central ideas in personality disorder theory, where experiences and

conditions in childhood, with emphasis on parental bonding, traumatic events and the social environment of the family, moderate genetic and environmental variability underlying emotional instability. The basic model is shown in Figure 7, below.

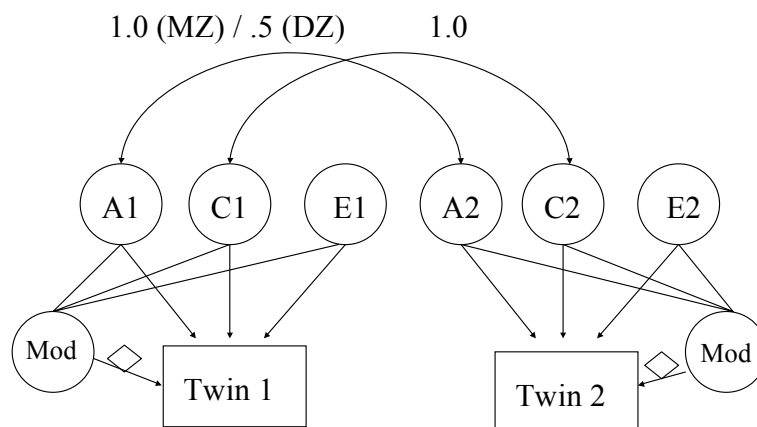


Figure 7. Moderator model. A1 and A2 represent genetic influences on twin 1 and twin 2, respectively. C1 and C2 represent common environmental influences, and E1 and E2 represent unique environmental influences. The definition variable, represented by a diamond, carries the value of the specified moderator (Mod) for each twin. For simplicity, means are not represented in the diagram but are included in the model when using raw data analysis.

In this model, the psychosocial experiences reported by each twin are represented by triangles. These can be reported levels of family conflict: a traumatic event like sexual abuse or gradients of parental warmth. The path between A1, A2 and the psychosocial variable indexes gene-environment interaction because these influences directly moderate the effect of the genetic influences (h^2). Similarly, the path between the triangles and C1, C2 indexes the degree to which the psychosocial stressors moderates the effect of shared environmental effects (c^2), and psychosocial stressor moderates the effect of nonshared environmental effects (e^2).

Such a model was used to test if any of the environmental conditions that were measured by the Family Environment Scale (FES: Moos & Moos) and Parental Bonding Inventory (PBI: Parker) moderated genetic influences underlying emotional stability. Only the FES and PBI scales that were found to have a zero heritability ($h^2 = 0.0$; see Jang et al) were used to ensure that any relationship between these environmental variables and emotional stability was not due to shared genetic effects or gene-gene interaction. The model illustrated in Figure 7 was applied and over the levels of reported FES Conflict, h^2 ranged from 87% to 14%. As the levels of family conflict increase, genetic variation for emotional instability decreases to nearly non-

existent levels but increases the variability directly attributable to environmental factors as shown by the concomitant increase in estimates of e^2 over the levels of family conflict. A similar, but weaker correlation was found for Maternal Overindulgence. The heritability of Emotional Dysregulation on this variable ranged from 68% to 47% over levels of Maternal Overindulgence.

Summary

Research into risk factors for the development of traumatic stress-related symptoms has been prevalent within the literature with many factors being identified (e.g., individual dispositions, genetic); however, less research has been done into factors contributing to resiliency in adults. While one may assume that resiliency factors may just be the opposite of the identified risk factors for the development of PTSD, it is clear in the developmental literature resiliency is much more complex than that. Future studies into the identification of resilient traits in adults and their mechanisms are clearly needed in order to understand this complex construct.

Review of empirical research on military personnel and those in other high-risk occupations

Review

There have been few studies that have investigated resiliency in military populations. The studies that have tackled this issue have investigated the protective function of resiliency (the personality trait of hardiness) within psychopathology, positive attributions following combat exposure, in conjunction with the importance of social support. The studies that have subsequently been produced have each contributed uniquely to the current research.

The first apparent study of resiliency in a military population was a case study by Hendin and Haas (1984) that outlined positive adaptations of ten Vietnam veterans who did not develop PTSD. In this study the authors identified a number of traits they found all ten veterans to possess; calmness under pressure, intellectual control, acceptance of fear, and a lack of excessively violent or guilt-arousing behaviours during combat. While this was the first step towards identifying variables that contributed to resiliency following traumatic stress, the findings were limited by its methodology (e.g., small sample size, lack of empirical validation).

In 1988, Solomon and colleagues conducted one of the first empirical studies to be conducted with a military population investigating resiliency. These researchers found that soldiers who use problem-focused coping were less likely to suffer PTSD. Examining the relationships between coping, locus of control, social support, and combat-related PTSD, the researchers followed Israeli soldiers for 2 and 3 years, who suffered a combat stress reaction episode during the 1982 Lebanon war. According to this study, the intensity of PTSD symptoms declined between the two periods, reflecting a process of recovery within which the locus of control became more internal, there was less emotion-focused coping, and there was more perceived social support (Solomon et al., 1988). These findings indicate that problem-focused coping is inversely related to the intensity of PTSD symptoms only in the 2nd year, whereas a coping style, characterized by distancing, is related to symptom intensity only in the 3rd year. The extent of the association between PTSD intensity and the resources measured decreased between the second and third years. This decrease suggested that the contribution of personal and social resources to PTSD intensity declines with time.

Similarly, Mikulincer and Solomon (1988) investigated soldier's attributions related to combat. Using the same sample as the previously mentioned study, analyses revealed significant relationships between attributions and PTSD at the two points of assessment. Increases in PTSD symptom intensity, psychiatric symptomatology, and

problems in social functioning 2 and 3 years after battle were all found to be associated with (1) attribution of good events to more external and uncontrollable causes, and (2) attribution of bad events to more internal, stable, and controllable causes. These results suggest that the use of adaptive attribution styles protects mental health while the use of maladaptive attribution styles decreases posttraumatic growth.

In a further investigation of posttraumatic growth and attributions following traumatic events, Elder and Clipp (1989) conducted a longitudinal study of veterans from both WWII and the Korean conflict. The results suggested that exposure to combat stress could result in either pathogenic or positive developmental effects. A number of positive and negative outcomes of military experience were identified. The positive outcomes included “learned to cope with adversity,” “self-discipline,” and “a broader perspective,” which were endorsed by approximately 60 to 70% of the respondents. Negative effects included “separation from loved ones,” “combat anxiety,” and “loss of friends.” The undesirable experiences generally referred to losses and negative affective states, whereas positive experiences were more likely to refer to skills or resource acquisition (Elder & Clipp, 1989). Furthermore, men who had been in heavy combat were most likely to list coping, self-discipline, and valuing life as positive outcomes (Elder & Clipp, 1989). At mid-life, exposure to heavy combat experience increased the likelihood of ego-resilient behaviours and diminished a sense of helplessness. The least resilient men (identified in a prewar assessment) were more likely to have experienced both emotional and behavioural problems after the war compared to those who scored high on pre-combat resiliency (83% vs. 17%). This archival study, however, was limited by having a relatively small sample and the unavailability of standardized measures of combat exposure and PTSD.

In another study, Bartone et al. (1989) followed a sample of family assistance workers who had been involved in the Gander disaster in 1985. This particular study aimed to identify the major stressors for disaster family assistance workers, to examine the relationship between degree of exposure to these stressors and health, and to locate risk factors, or resistance resources, that might modulate any ill effects of exposure. Results indicated that survivor assistance workers are at risk for increased illness, psychiatric symptoms, and negative psychological well-being for up to a year after commencing their support activities. Further, social supports and hardiness (or dispositional resiliency) interacted to modulate the effects of exposure on illness. The supports of family, friends, and work supervisors were an important resource for many assistance workers, particularly at high exposure or stress levels (Bartone, et al., 1989). Having these kinds of supports appeared to protect individuals from related psychological and physical morbidity. The authors speculated that individuals high in hardiness may adjust more readily to chaos and confusion of disaster situations. These individual might also be more apt to perceive challenges and opportunities for growth where others perceive threat and disruption. Disaster helpers with a characteristic “hardy” worldview may be more likely to regard their assistance activities as highly meaningful and be more committed to this role. Additionally, they are perhaps better

equipped to accept, and make sense of, ambiguously defined roles, drawing upon a personal sense of control to formulate their own definitions and decisions about their position and responsibilities. Thus, over time, hardy individuals may make optimistic retrospective appraisals of traumatic experiences (Bartone, et al., 1989).

In 1990, Casella and Motta reported characteristic differences between Vietnam veterans with and without PTSD. In their study they reported that veterans without PTSD tended to have lower Neuroticism scores on the Eysenck Personality Questionnaire (Eysenck & Eysenck, 1975), despite having high combat exposure indicating emotional strength and resiliency. In addition, veterans without PTSD tended to score higher on a measure of internal locus of control. These veterans may have felt they had more control over their destiny, which may have helped them cope more effectively with their experiences of combat. Further, those veterans without PTSD tended to provide a cognitive structure to their experience during their time in Vietnam (e.g., ways of organizing, conceptualizing, and understanding the experience), similar to the findings of Hendin and Haas (1984). Finally, an interesting trend emerged where locus of control orientation was positively correlated with ability to structure the Vietnam experience. This suggests that those veterans who had greater internal locus of control were motivated toward conceptualizing the Vietnam experience in meaningful, organized terms.

Taking a step further in investigating the relationship between attributions and combat exposure, Aldwin et al. (1994) examined whether appraisals of desirable and undesirable effects of military service mediated the effect of combat stress on posttraumatic stress disorder (PTSD) symptoms in later life in male veterans. The researchers sought to link the developmental model of Elder and Clipp (1989) using measures more commonly used in PTSD research. Furthermore, the authors extended Elder and Clipp's model by examining appraisals as mediators of the relationship between combat exposure in early life and PTSD symptoms in late life. In general, the findings of Aldwin et al.'s (1994) study indicated more desirable effects of military service (e.g., mastery, self-esteem, and coping skills) were reported than undesirable ones; both increased with greater combat exposure. Path analysis revealed that the appraisals were independent and opposite mediators, with undesirable effects increasing and desirable effects decreasing the relationship between combat exposure and PTSD, even after controlling for depression and response style. Although lifelong negative consequences of combat exposure were observed, perceiving positive benefits from the stressful experience mitigated the effect. Perhaps the most interesting finding in this study was the degree to which the men viewed their military experience, and even their combat experience, as causing desirable consequences. The men viewed this period in their lives as having maturational effects, broadening their perspective, enhancing coping skills and self-esteem, and increasing both self-discipline and independence. The authors expected to see an inverted-u relationship between desirable appraisals and combat stress, with those experiencing moderate combat exposure highest, similar to the diathesis stress model. There were, however,

only linear effects: the higher the combat exposure, the more the men reported positive developmental outcomes (Aldwin et al., 1994).

Sutker et al. (1995) used a discriminant function model to study associations between personal and environmental resources and psychological outcomes subsequent to war zone stress among Persian Gulf War veterans. Personality hardiness, commitment, avoidance coping, and perceived family cohesion emerged as consistent predictors of a PTSD diagnosis. Findings suggest personal characteristics and environmental factors may alter vulnerability to negative war stress outcomes. Among the factors of interest in this study, personal resource variables appeared to be more strongly related to psychological vulnerability or resistance to the negative impact of war zone duty than were the resources selected from the environment domain. Personal resources accounted for 35% of the variance in discriminating troop subsets, whereas the remaining variables accounted for 5%. Although the commitment disposition of the hardiness construct appeared to function as a relatively strong resistance resource, there is the possibility that lower scores on hardiness measures simply confirm the presence of PTSD as a disorder (Sutker et al., 1995).

The results of this study underscore the conclusions of Kobasa et al. (1982) and Bartone et al. (1989) that inclination to involve oneself in, and to experience, purposefulness in activities may protect against the negative effect of stressful events (Sutker et al., 1995). Although the hardiness constructs of control and challenge differentiated troop subsets, these dimensions did not contribute meaningfully to the discriminant function over and above the commitment measure. Results also revealed a significant association between PTSD symptoms and avoidance coping strategies. This relationship, as was acknowledged for hardiness results, does not convey information about the direction of the causal pathway. Use of certain coping strategies may convey risk for psychological distress under stressful circumstances, or conversely, increased coping behaviours, and avoidance coping specifically, may be an expression of PTSD (Sutker et al., 1995).

Neria et al. (1998) conducted an eighteen-year follow-up of Israeli POW's and combat veterans. Specifically, the effects of social support of subsequent PTSD symptoms and other psychopathology were investigated. POW's had more PTSD symptoms than the control group (combat veterans), but those that experienced active support at homecoming had fewer PTSD symptoms. Those who received social support at homecoming also reported fewer avoidance symptoms. Negative reactions at homecoming were associated with higher reports of psychiatric symptoms on the Symptom Checklist-90. The results of this study highlight the importance of social support in the conceptualization of resiliency, especially when considering military populations. Neria et al. (1998) suggest that a warm reception at homecoming may serve as a corrective emotional experience that bolsters the victim's sense of safety, personhood, and sense of belonging.

Subsequently, in possibly two of the most comprehensive studies of resiliency in military populations, King et al. (1998, 1999) investigated the relationships between pre-war risk factors, war-zone stressors and post-trauma resilience-recovery factors. In the first study, King et al. (1998) examined hardiness, social support and additional stressful life events in a sample of Vietnam Veterans from the National Vietnam Veterans Readjustment Survey (NVVRS). Using hardiness measure based on Kobasa's (1979) conceptualization of the personality construct, the researchers developed their measure from a larger pool of items. The researchers found that war zone stressors of witnessing atrocities and being in a malevolent environment have a negative impact on hardiness. Meanwhile, hardiness was also negatively impacted by stressful life events (King et al., 1998). Hardiness had both direct and indirect effects on PTSD through structural and functional social support, with stronger effects through functional social support. This supports the notion that hardy individuals seek-out others for realistic help at times of stress, and are able to build larger social support networks.

In their second study, King and colleagues (1999) expanded their model to include pre-trauma risk factors (family instability, childhood antisocial behaviour), war-zone stressors (combat, perceived threat), and post-trauma resilience-recovery factors (hardiness, social support) to evaluate these variables' relationships to PTSD. Structural equation modeling indicated that hardiness and social support mediated the effects of both pre-war risk factors and war-zone stressors on PTSD symptoms, with higher levels of hardiness and social support resulting in fewer PTSD symptoms. For male veterans, war-zone stressors were more salient to PTSD symptoms (King et al., 1999), however, for female veterans, pre-war resiliency factors were more salient in the effects on PTSD symptoms. Furthermore, pre-war risk factors (early trauma history, childhood antisocial behaviour, family instability, and early trauma experience) were closely associated with hardiness and social support, independent of war-zone stressors for both sexes. To highlight the importance of hardiness and social support, the authors note that the strength of association between hardiness and social support to PTSD may offset the deleterious consequences of stressors on PTSD.

Following this, Taft et al. (1999) assessed the relationship of hardiness and social support to PTSD and physical health in veterans from the NVVRS. Hardiness was negatively correlated with PTSD, suggesting those with lower hardiness scores reported more PTSD symptoms (in both men and women). Hardiness was also negatively correlated with physical health conditions and functional health status in men only. Hardiness was positively correlated with social support in both men and women. Using path analysis, the researchers indicated that both hardiness and social support were intermediary variables between combat exposure and PTSD for men, but only social support served this function for women. The indirect effect of combat exposure on PTSD, through hardiness and social support, was somewhat less than its direct effect (Taft et al., 1999).

In the same year, Bartone (1999) examined hardiness as a potential protective variable among Army reserve personnel mobilized for the Persian Gulf War. Regression results indicated hardiness interacted with combat-related stress and stressful life events to predict fewer psychiatric symptoms on several measures (e.g., Brief Symptom Inventory, Impact of Events Scale). The pattern of results suggested that hardiness protects against the ill effects of stress, particularly under high and multiple-stress conditions.

The results of this study suggest that personality variables, such as hardiness, can partially explain why some soldiers remain healthy under war-related stress that causes many soldiers to develop pathology (Bartone, 1999). In this study, hardiness emerged as a significant predictor of health across a variety of health indicators. More importantly, hardiness was found to interact with combat stress to predict fewer symptoms under stress. This pattern of results further suggests that those who are experiencing, or have recently experienced, significant major stressful life events, in addition to being exposed to combat stressors, are at the greatest risk for psychological symptoms of various kinds. It also appears that, although personality hardiness exerts modest salubrious effects under low stress conditions, it generally has a stronger influence under high-stress conditions.

One possibility for these findings is that hardy persons are better able to develop and use social support resources (Bartone, 1999). Another possible mechanism for the positive hardiness effect involves the individual's cognitive interpretation of the stressful events and life circumstances. The tendency to find positive meaning in life, especially at work, is a defining feature of personality hardiness (Kobasa, 1979; Maddi, 1967; Maddi & Kobasa, 1984). People with a hardy personality style are more inclined to attach or create positive meaning and importance to their work activities and are also less vulnerable to the ill effects of work and life stress (Kobasa et al., 1982). The results of Bartone's (1999) study suggest that personality hardiness is an important variable contributing to continued soldier resiliency and good health across a range of missions and stressors. Although these results are suggestive regarding the underlying processes through which hardiness affects health, additional investigation is crucial. Future studies should seek to clarify how, and under what conditions, hardiness protects soldiers from stress, as well as how hardy cognitive appraisals and behaviors might be increased among those who must undergo the severe stressors of deployment and war.

Gold and colleagues (2000) aimed to investigate predictors of persistent symptoms of post-traumatic stress disorder. World War II and Korean Conflict POWs were interviewed at two points in time; 1965 and 1990. Predictors included PTSD symptomatology measured in 1965 by items from the Cornell Medical Index (CMI), severity of captivity trauma, resiliency factors, and post-trauma social support. A series of regression analyses investigating the prediction of current PTSD from resiliency (education and age at time of war trauma), war trauma (disease index),

social support, past distress (1965 CMI), and interactions of resiliency and social support with war trauma all revealed, with some variation, that, in decreasing order of importance, war trauma and resiliency best predicted current PTSD symptomatology.

Waysman et al. (2001) further investigated two models positing direct versus moderating effects of hardiness in relation to long-term positive and negative changes following exposure to traumatic stress. Participants included Israeli POWs and a matched group of veterans of the 1973 Yom Kippur War. Findings were consistent with a model that posits moderating effects of hardiness on both long-term negative and positive changes. Hardiness was found to be associated with lower vulnerability to negative changes among POWs and, as such, the authors suggested it be conceived as a protective factor (Rutter, 1987) that mitigates the detrimental effects of extreme stress. Hardiness was also found to be associated with higher levels of positive change among POWs, and was subsequently seen as a resource that promotes the ability to experience psychological growth following traumatic events.

Continuing this line of study, Waysman et al. (2001) investigated whether these effects are unique to victims of trauma or reflect a more general phenomenon. Findings indicated (a) direct effects of hardiness on both positive and negative changes, and (b) a stress moderating effect for hardiness in relation to both positive and negative changes. This pattern of results supports the second model, which predicted both direct and moderating effects. This study provided a relatively rare opportunity to examine the role of hardiness in relation to psychological adjustment following exposure to traumatic stress. Hardiness was found to function as a protective factor in relation to negative outcomes and, to a lesser degree, as a boosting factor in relation to positive outcomes. Moreover, hardiness was found to be not only of general significance for most people, irrespective of stressful experiences (a direct effect), but also of particular significance for those exposed to traumatic stressors (a moderating effect).

Zakin et al. (2003) further assessed the role of hardiness and attachment style, as personal resources in adjustment to stress of POWs and combat veterans. The sample consisted of POWs from the 1973 Yom Kippur war as well as comparable controls who fought in the same war. The study took place almost two decades after the war. Results indicated that both hardiness and attachment style had a direct main effect and were inversely related to PTSD and psychiatric symptomatology. Results also demonstrated that the two resources worked in a mutually compensatory manner. The results are that, among both combat veterans and ex-POWs, greater hardiness and secure attachment style were separately associated with reduced vulnerability to PTSD. These variables are also associated with reduced vulnerability to the associated symptoms of depression, anxiety and somatization. The findings also indicate a strong interaction between hardiness and attachment style on the various distress measures (Zakin et al., 2003). This interaction indicates that, in addition to the direct impact, hardiness and attachment style may act in a compensatory manner, such that an

abundance of one may compensate for a paucity of the other; therefore, the attachment resources of subjects with low levels of hardiness were more effective, while the hardiness of insecure subjects provided them with more protection.

Other notable findings in this study, included that the moderation effect of hardiness or attachment with group was not significant (the interaction between each of these variables and the research group was not significant) (Zaklin et al., 2003). This finding is of particular importance in light of the debate in the literature regarding whether or not hardiness in fact buffers stress or only contributes to well being in a general way (e.g. Blaney & Ganellen 1990). The lack of moderating effects in this study may be attributed to the fact that both combat and war captivity are extreme traumatic stressors. The initial assumption was that since war captivity is more stressful than combat alone, any moderating effect would show up in the comparison. It seems, however, that in both situations, the extreme stress experienced by the subjects may have led them to use all their personal resources in full, thereby obscuring any possible moderating effects of hardiness and attachment. Such effects may have emerged if the magnitude of the two stress situations were sufficiently different.

Summary

The empirical research outlined in this section provide insight into resiliency in military populations. These studies have identified factors that seem to be related to resiliency (e.g., emotional control, internal locus of control, calmness under pressure, social support). A number of studies also indicate that these protective factors also serve their purpose even in high stress/high combat settings (Aldwin et al., 1994; Bartone, 1999). While the research to date has added a great deal to our understanding of resiliency in military populations, there is still a great deal of work to be done. Future studies could examine the validity of theories of resiliency in military populations, especially given the specialized training and circumstances military personnel experience. In addition, further case studies of resilient military personnel could add to our knowledge of mechanisms that lead to resiliency and thus add more depth to models and theories of resiliency. Indeed, further research into resiliency in military populations may contribute to the further validation of resiliency measures as well as provide insight into the differences between military versus non-military populations.

A review of resiliency measures

Deployment Risk and Resiliency Inventory (DDRI)

Authors: King, L. A., King, D. W., Vogt, Knight, & Samper

Variable: Risk and protective factors related to post-deployment symptomatology.

Description: The Deployment Risk and Resilience Inventory (DRRI) is a collection of 14 relatively brief measures of factors that may be associated with the postdeployment health and well-being of military veterans. The measures are intended to identify deployment-related factors that either put veterans at risk for postdeployment symptomatology or that serve a protective function. Any one or more of the measures may be used separately, or the entire DRRI can be administered as a package to survey key predeployment, deployment, and postdeployment variables. Information generated from the administration of DRRI measures can facilitate a better understanding of the special training and preparedness needs of personnel facing the challenges presented by modern military operations. The wording of all items in all measures of the DRRI is appropriate to contemporary military deployments. In the development of these measures, careful attention was given to content validity, with efforts including focus groups with members of the target population, consultation with content experts, and iterative procedures to insure relevance and appropriate wording and presentation of item content.

Reliability: Three psychometric studies followed with veterans of the first Gulf War. The psychometric studies provided evidence for high internal consistency reliability with Cronbach's alphas ranging from .72-.94.

Validity: There is also preliminary support for the validity of the measures in terms of their demonstrated associations with important health outcomes, ability to discriminate between veteran subgroups, and fairly weak associations with a measure of social desirability.

Location: King, D. W., King, L. A., & Vogt, D. S. (2003). *Manual for the Deployment Risk and Resilience Inventory (DRRI): A Collection of Measures for Studying Deployment-Related Experiences of Military Veterans*. Boston, MA: National Center for PTSD. Email: Drs. Dan and Lynda King, dandlking@comcast.net, included in PDF format.

Comment: The DDRI is a new measure that shows promise in becoming widely used in Military research.

References:

King, L. A., King, D. W., Vogt, D. S., Knight, J., & Samper, R. E. (in press). Deployment risk and resilience inventory. *Military Psychology*, 00, 000-000.

The Dispositional Resilience Scale

Authors: Bartone, Ursano, Wright, & Ingraham (1989)

Variable: Personality variable of hardiness

Description: This measure is a slightly modified version of Kobasa's (1979) measure of personality hardiness. It has 45 items and correlates highly with the older version of the scale. This measure was effective in differentiating Army disaster assistance workers who remained healthy from their counterparts who developed stress-related symptoms, this inventory taps the characteristic manner by which individuals interpret and approach experiences.

Reliability: The three subscales had good reliability with internal consistency coefficients ranging from .62 to .82. For the overall measure, Cronbach's alpha was .85.

Validity: Evidence for the construct validity of the old hardiness test is summarized in Kobasa et al. (1985). Principal components factor analysis (varimax rotation) revealed three factors of commitment, challenge, and control, confirming the relevance of a three-facet model of hardiness.

Location: Bartone, P. T., Ursano, R., Wright, K., & Ingraham, L. (1989). The impact of military air disaster on the health of assistance workers. *Journal of Nervous and Mental Disease*, 177, 317-328. Email: Dr. Paul Bartone, bartonep@ndu.edu

References:

Kobasa, S. C. (1979). Stressful life events, personality, and health: An inquiry into hardiness. *Journal of Personality and Social Psychology*, 37, 1-11.

Kobasa, S. C., Maddi, S. R., Puccetti, M. C., et al. (1985). Effectiveness of hardiness, exercise, and social support as resources against illness. *Journal of Psychosomatic Research*, 29, 525-533.

The Connor-Davidson Resilience Scale (CD-RISC)

Authors: Conner & Davidson

Variable: Resilience

Description: The Connor-Davidson Resilience scale (CD-RISC) is a self-report measure comprised of 25 items, each rated on a 5-point scale (0-4), with higher scores reflecting greater resilience. The CD-RISC has sound psychometric properties and distinguishes between those with greater and lesser resilience. By using the CD-RISC, the authors note that their study shows that resilience is quantifiable and influenced by health status (i.e., individuals with mental illness have lower levels of resilience than the general population); resilience is modifiable and can improve with treatment; and greater improvement in resilience corresponds to higher levels of global improvement. The CD-RISC could have potential utility in both clinical practice and research.

Reliability: The CD-RISC has been tested in the general population, as well as in clinical samples, and demonstrates good internal consistency (Cronbach's $\alpha = .89$) and test-retest reliability (intraclass correlation coefficient = .87).

Validity: The scale exhibits validity relative to other measures of stress and hardness, and reflects different levels of resilience in populations that are thought to be differentiated, among other ways, by their degree of resilience (e.g., general population vs. patients with anxiety disorders). The CD-RISC has not been validated against an objective (i.e., behavioral or third party) measure, or against biological measures of resilience, such as neuropeptide-Y responses to extreme stress (Morgan et al., 2000).

Location: Connor, K. M., & Davidson, J. R. T. (2003). Development of a new resilience scale: The Connor-Davidson Resilience Scale (CD-RISC). *Depression and Anxiety*, 18, 76-82. Email: Dr. Kathryn Connor, Kathryn.connor@duke.edu

References:

Morgan, C. A., III, Wang, S., Southwick, S. M., Rasmusson, A., Hazlett, G., Hauger, R. L., & Charney, D. S. (2000). Plasma neuropeptide-Y concentrations in humans exposed to military survival training. *Biological Psychiatry*, 47, 902-909.

The Resilience Scale (RS)

Authors: Wagnild & Young

Variable: Resilience

Description: The purpose of the RS is to identify the degree of individual resilience, considered by the authors to be a positive personality characteristic that enhances

individual adaptation. The RS was developed from a qualitative study of 24 women who had adapted successfully following a major life event and was initially available and pre-tested in 1988. The constructs the scale was developed to address were: equanimity, perseverance, self-reliance, meaningfulness, and existential aloneness. The authors suggest the RS can be broken down into two factors: personal competence and acceptance of self.

Reliability: The internal consistency of the RS is respectable with Cronbach's alphas ranging from .76-.91. Test-retest reliability was also respectable with correlation ranging from .67 to .84, suggesting resilience is stable over time.

Validity: Support for concurrent validity was shown by high correlations of the RS with well-established valid measures of constructs linked with resilience and outcomes of resilience.

Location: Wagnild, G. M., & Young, H. M. (1993). Development and psychometric validation of the Resilience Scale. *Journal of Nursing Measures, 1*, 165-178. Website: www.resiliencescale.com, measure included below.

Comment: The resilience scale has been used in a number of published studies since its inception, primarily in the area of nursing.

Measure:

Please read the following statements. To the right of each you will find seven numbers, ranging from "1" (Strongly Disagree) on the left to "7" (Strongly Agree) on the right. Circle the number which best indicates your feelings about that statement. For example, if you strongly disagree with a statement, circle "1". If you are neutral, circle "4", and if you strongly agree, circle "7", etc.

	<u>Strongly</u>						<u>Strongly</u>
	<u>Disagree</u>						<u>Agree</u>
	1	2	3	4	5	6	7
1. When I make plans, I follow through with them.							
2. I usually manage one way or another.	1	2	3	4	5	6	7
3. I am able to depend on myself more than anyone else.	1	2	3	4	5	6	7
4. Keeping interested in things is important to me.	1	2	3	4	5	6	7
5. I can be on my own if I have to.	1	2	3	4	5	6	7
6. I feel proud that I have accomplished things in life.	1	2	3	4	5	6	7
7. I usually take things in stride.	1	2	3	4	5	6	7
8. I am friends with myself.	1	2	3	4	5	6	7
9. I feel that I can handle many things at a time.	1	2	3	4	5	6	7
10. I am determined.	1	2	3	4	5	6	7
11. I seldom wonder what the point of it all is.	1	2	3	4	5	6	7
12. I take things one day at a time.	1	2	3	4	5	6	7
13. I can get through difficult times because I've experienced difficulty before.	1	2	3	4	5	6	7
14. I have self-discipline.	1	2	3	4	5	6	7

	<u>Strongly Disagree</u>					<u>Strongly Agree</u>	
	1	2	3	4	5	6	7
15. I keep interested in things.							
16. I can usually find something to laugh about.							
17. My belief in myself gets me through hard times.							
18. In an emergency, I'm someone people can generally rely on.							
19. I can usually look at a situation in a number of ways.							
20. Sometimes I make myself do things whether I want to or not.							
21. My life has meaning.							
22. I do not dwell on things that I can't do anything about.							
23. When I'm in a difficult situation, I can usually find my way out of it.							
24. I have enough energy to do what I have to do.							
25. It's okay if there are people who don't like me.							
26. I am resilient.							

The Baruth Protective Factors Inventory (BPFI)

Authors: Baruth & Carroll

Variable: Protective factors for resiliency

Description: The Baruth Protective Factors Inventory (BPFI) is a 16-item questionnaire that was developed to identify the presence of greater resilience. It was formally aimed at assessing the incidences of four primary protective factors outlined by Papalia et al. (1998): (a) adaptable personality, (b) supportive environment, (c) fewer stressors, and (d) compensating experiences. For each item participants respond to a 5-point Likert scale, with the most resilient responses warranting a score of 5. the inventory produces an overall resiliency score (with a possible high of 80 and low of 16) as well as scale scores (with a high of 16 and a low of 4) for each of the four resiliency constructs.

Reliability: The overall inventory yielded a reliability estimate of .83. The reliabilities of the four individual scales were: adaptive personality, .76; supportive environment, .98; fewer stressors, .55; and compensating experiences, .83.

Validity: The measure was also validated against the Multidimensional Health Profile: Psychological functioning (MHP-P; Ruehlman, Lanyon, & Karoly, 1998), with resulting significant correlations, suggesting acceptable construct validity.

Location: Baruth, K. E., & Carroll, J. J. (2002). A formal assessment of resilience: The Baruth Protective Factors Inventory. *Journal of Individual Psychology*, 58, 235-244. The measure is included in the article.

Comment: While the BPF looks promising, it has not been used in any further published studies, therefore it needs further validation studies.

References:

- Baruth, K. E. (2005). *The Baruth protective factors inventory as a clinical assessment of resilience*. Dissertation Abstracts International Section A: Humanities and Social Sciences. Vol 65(9-A), pp. 3286.
- Papalia, D. E., Olds, S. W., & Felman, R. D. (1998). *Human development* (7th ed.). Boston: McGraw-Hill.
- Ruehlman, L. S., Lanyon, R. I., & Karoly, P. (1998). *Multidimensional Health Profile Professional Manual*. Odessa, FL: Psychological Assessment Resources.

Measure:

Directions: This is an inventory about the stressful events you have experienced in your life and how you handled them. Please indicate the extent to which you agree or disagree with the following statements by marking strongly agree, agree, neither agree nor disagree, disagree, or strongly disagree for each item.

		strongly agree	agree	neither agree nor disagree	disagree	strongly disagree
1	There have been more problems than positive experiences with my health status in the last 3 months.					
2	There have been more problems than positive experiences with my finances in the past 3 months.					
3	There have been more problems than positive experiences with my family/friends in the past 3 months.					
4	There have been more problems than positive experiences with my work/school in the past 3 months.					
5	I feel that I am optimistic and concentrate on the positives in most situations.					
6	I feel that I am a creative, resourceful, and independent person.					
7	Most people think I'm friendly and like to be around me.					
8	I feel that I am competent and have high self esteem.					
9	I have a good relationship with at least one supportive person (whether in your family or not).					
10	I have at least one caring person in my life (whether in your family or not).					
11	I feel that I can trust at least one in my life (whether in your family or not).					

12	I have at least one person who is interested in my life (whether in your family or not).					
13	I have been able to resolve many (but not all) of my problems by myself.					
14	I feel I have control over many (but not all) events in my life.					
15	I feel that I have coped well with one or more major stressors in my life.					
16	I have been able to make “the best out of a bad situation” a number of times in my life.					

Resiliency Scales for Adolescents (RSA)

Authors: Prince-Embury

Primary Reference: Prince-Embury, S. (2005). *Resiliency scales for adolescents: A profile of personal strengths*. San Antonio, TX: Harcourt Assessment.

Variable: Adolescence resiliency

Description: Unable to obtain information, must buy the manual from Harcourt in order to get this.

A Measure of Resiliency

Authors: Jew, Green, & Kroger

Variable: Resilience

Description: This measure was developed based on the skills and abilities thought by Mrazek and Mrazek (1987) to constitute factors rendering children resistant to psychological harm. These 12 factors include: rapid responsivity to danger,

precocious maturity/pseudo adulthood, dissociation of affect, information seeking, formation and utilization of relationships for survival, positive projective anticipation, decisive risk-taking, the conviction of being loved, idealization of aggressor's competence, cognitive restructuring of painful events, altruism, and optimism. The results of preliminary studies found that the measure comprised three subscales reflecting active skill acquisition, independence/risk-taking, and future orientation. The authors suggest that these results lend promise to the scale operationalizing resilience.

Reliability: A further modification of the scale found increased reliabilities and reduced length.

Validity: This revised scale was also successful at differentiating students that were considered to be at risk (e.g., due to divorce, drug/alcohol abuse, and trouble with the law). It was also found that the three subscales were modestly related to measures of achievement, self-perception, and locus of control. Subscale scores also significantly differentiated institutionalized adolescents from non-institutionalized adolescents. The authors note that further studies of this scale are needed to assess its reliability and validity.

Location: Jew, C. L., Green, K. E., & Kroger, J. (1999). Development and validation of a measure of resiliency. *Measurement & Evaluation in Counseling & Development*, 32, 75-89. The measure is available from the primary author at a cost of \$100 per study, contact Dr. Jew at: cjew@clunet.edu

Resilience Scale for Adults (RSA)

Authors: Friborg, Hjemdal, Rosenvinge, & Martinussen

Variable: Adult resilience

Description: The Resilience Scale for Adults was developed to address limitations in existing resilience measures (e.g., age-inappropriate questions for adults, and lack of items that address social support). Originally developed by Hjemdal et al., 2001, the current study expanded the results. The scale covers three main categories of resilience - dispositional attributes, family cohesion/warmth, and external support systems. The first category of "dispositional attributes" was comprised by three dimensions - "personal competence," social competence," and "personal structure." The second category, "family cohesion/warmth", was comprised by the dimension "family coherence" that measured amount of family conflict, cooperation, support, loyalty, and stability. The third category, "external support systems", was comprised of the dimension "social support" that measured access to external support systems.

Reliability & Validity: The internal consistency of the RSA was high and all the subscales were positively related to other measures of personal resources. The RSA was also able to significantly differentiate between a patient sample and a control sample.

Location: Friborg, O., Hjemdal, O., Rosenvinge, J. H., & Martinussen, M. (2003). A new rating scale for adult resilience: what are the central protective resources behind healthy adjustment? *International Journal of Methods in Psychiatric Research*, 12, 65-76. A copy of the measure is included in this article.

References:

Hjemdal, O., Friborg, O., Martinussen, M., & Rosenvinge, J. H. (2001) Preliminary results from the development and validation of a Norwegian scale for measuring adult resilience/Mestring og psykologisk motstandsdyktighet hos voksne: Utvikling og forelopig validering av et nytt instrument. *Tidsskrift for Norsk Psykologforening*, 38, 310-317

Measure:

<i>Personal strength/Perception of self</i>			
When something unforeseen happens	I always find a solution	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	I often feel bewildered
My personal problems	are unsolvable	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	I know how to solve
My abilities	I strongly believe in	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	I am uncertain about
My judgments and decisions	I often doubt	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	I trust completely
I difficult periods I have a tendency to	view everything gloomily	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	find something good that helps me thrive
Events in my life that I cannot influence	I manage to come to terms with	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	are a constant source of worry/concern
Personal strength/Perception of future			
My plans for the future are	Difficult to accomplish	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	possible to accomplish
My future goals	I know how to accomplish	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	I am unsure how to accomplish
I feel that my future looks	very promising	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	uncertain

My goals for the future are	unclear	□□□□□	well thought out
Structured style			
I am at my best when I	have a clear goal to strive for	□□□□□	can take one day at a time
When I start on new things/projects	I rarely plan ahead, just get on with it	□□□□□	I prefer to have a thorough plan
I am good at	organizing my time	□□□□□	Wasting my time
Rules and regular routines	are absent in my everyday life	□□□□□	Simplify my everyday life
Social Competence			
I enjoy being	together with other people	□□□□□	by myself
To be flexible in social settings	is not important to me	□□□□□	is really important to me
New friendships are something	I make easily	□□□□□	I have difficulty making
Meeting new people is	difficult for me	□□□□□	something I am good at
When I am with others	I easily laugh	□□□□□	I seldom laugh
For me, thinking of good topics for conversation is	difficult	□□□□□	easy
Family Cohesion			
My family's understanding of what is important in life is	quite different than mine	□□□□□	very similar to mine
My family is characterized by	disconnection	□□□□□	healthy coherence
In difficult periods my family	keeps a positive outlook on the future	□□□□□	views the future as gloomy
Facing other people, our family acts	unsupportive of one another	□□□□□	loyal towards one another
In my family we like to	do things on our own	□□□□□	do things together
		□□□□□	
Social Resources			
I can discuss personal issues with	no one	□□□□□	friends/family members
Those who are good at encouraging me are	some close friends/family members	□□□□□	nowhere
The bonds among my friends is	weak	□□□□□	strong
When a family member experiences a crisis/emergency	I am informed right away	□□□□□	It takes a while before I am told

I get support from	friends/family members	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	no one
When needed, I have	no one who can help me	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	always some one who can help me
My close friends/family members	appreciate my qualities	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	dislike my qualities

Measures of Coping Styles Related to Resiliency

Coping Responses Inventory (CRI)

Authors: Moos

Variable: Coping styles

Description: The CRI (Moos & Schaefer, 1993) contains 48 items that are rated on a 4-point Likert-type scale from “0=not at all” to “4=yes, fairly often.” Moos and colleagues (Moos, 1993) started with a 72-item version of the Coping Responses Inventory (CRI) that was revised to the current 48-item version. Through the use of independent judges to categorize coping strategies and consideration of Cronbach's alpha, the researchers derived eight dimensions of coping (Moos, 1993). The eight dimensions are included under two broad headings: Approach Coping Responses: (1) Logical Analysis, (2) Positive Reappraisal, (3) Seeking Guidance and Support, and (4) Problem Solving; Avoidance Coping Responses: (5) Cognitive Avoidance, (6) Acceptance or Resignation, (7) Seeking Alternative Rewards, and (8) Emotional Discharge. The Approach Coping Responses cluster consists of items such as, “Think of different ways to deal with the problem?” and, “Did you make a plan of action and follow it?” The Avoidance Coping Responses cluster consists of items such as “I tried not to think about the problem” and “I tried to stay away from people in general.”

Reliability: For the eight dimensions, Cronbach's alpha ranged in a sample of males ($n=1194$) from 0.61 to 0.74 and in females ($n=722$) from 0.58 to 0.71.

Location: Moos, R.H. (1993). *Coping Responses Inventory Adult Form Manual*. Odessa, FL: Psychological Assessment Resources.

References:

Moos, R.H., & Schaefer, J. (1993). Coping resources and processes: current concepts and measures. In: Goldberger, L. & Breznitz, S. (Eds.), *Handbook of stress: Theoretical and clinical aspects* (2nd ed., pp. 234-257). New York: Macmillan.

Ways of Coping Questionnaire

Authors: Folkman & Lazarus

Variable: Coping styles

Description: The *Ways of Coping Questionnaire (WOC)* (Folkman & Lazarus, 1980) is a 67-item, four-point scale (0 = not used, 1 = used somewhat, 2 = used quite a bit, 3 = used a great deal) which aims to explore the role of coping in the relationship between stress and adaptational outcomes. The items on the original WOC were classified on the basis of 'problem-focused' or 'emotion-focused' ways of coping. Problem-focused coping refers to efforts undertaken to manage or alter the troubled person–environment relationship that is the source of stress, while emotion-focused coping refers to efforts undertaken to regulate stressful emotions. This checklist measures eight coping strategies, namely, confrontational coping, distancing, self-controlling, seeking social support, accepting responsibility, escape–avoidance, problem-solving and positive reappraisal. The revised scales were consistently more reliable and shared substantially less variance than the original scales. The construct validity of the questionnaire was good.

Location: Folkman, S., & Lazarus, R. S. (1988). *Ways of Coping Questionnaire*. Mindgarden: Menlo Park, CA.

The Perceived Stress Scale (PSS)

Authors: Cohen, Kamarck, & Mermelstein

Variable: Perceived stress

Description: The Perceived Stress Scale (PSS) is a 14-item measure developed to measure the degree to which situations in one's life are appraised as stressful. PSS scores are obtained by reversing scores on the seven positive items and then summing across all items. The PSS was designed for use with community samples with at least junior high school education. The authors note that the PSS is more closely related to a life-event impact score which is to some degree based on the respondent's appraisal of the event, than to the more objective measure of the number of events occurring within a particular time span. There is a 4-item version available for telephone screening.

Reliability: Alpha coefficients for the PSS range from .84 to .86. Test-retest coefficients range from .85 (for two days) to .55 (for six weeks).

Validity: The PSS was also a good predictor of health and health-related outcomes, social anxiety, and was highly correlated with depression, although it was found to measure a different and independently predictive construct.

Location: Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behaviour*, 24, 386-396. A copy of the measure is included in the article.

Measure:

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate *how often* you felt or thought in a certain way. Although some of the questions are similar, there are differences between them and you should treat each one as a separate question. The best approach is to answer each question fairly quickly – that is don't try to count up the number of times you felt a particular way, but rather indicate the alternative that seems like a reasonable estimate.

For each question choose from the following alternatives:

0. never
 1. almost never
 2. sometimes
 3. fairly often
 4. very often
-
1. In the last month, how often have you been upset because of something that happened unexpectedly? ____
 2. In the last month, how often have felt that you were unable to control the important things in your life? ____
 3. In the last month, how often have you felt nervous and stressed? ____
 4. In the last month, how often have you dealt successfully with irritating life hassles? ____*
 5. In the last month, how often have you felt confident that you were effectively coping with important changes that were occurring in your life? ____*
 6. In the last month, how often have you felt confident about your ability to handle your personal problems? ____*

7. In the last month, how often have you felt that things were going your way?
_____*
8. In the last month, how often have you found that you could not cope with all the things that you had to do? _____
9. In the last month, how often have you been able to control irritations in your life?
_____*
10. In the last month, how often have you felt that you were on top of things? _____*
11. In the last month, how often have you been angered because of things that happened that were outside of your control? _____
12. In the last month, how often have you found yourself thinking about things that you have to accomplish? _____
13. In the last month, how often have you been able to control the way you spend your time? _____*
14. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them? _____

* Scored in the reverse direction

Measures of Posttraumatic Growth

Elder and Clipp Measure of Posttraumatic Growth

Authors: Elder & Clipp

Variable: Perceived positive and negative consequences of military service

Description: Appraisals of the effects of military service can be assessed using a 28-item scale developed by Elder and Clipp (1989), divided evenly between desirable and undesirable items. Using a 4-point rating scale (in which 0 = *not at all* and 3 = *a lot*), participants indicate to what extent they perceived positive and negative consequences of military service. The positive outcomes included items such as “learned to cope with adversity,” “self-discipline,” and “a broader perspective,” whereas examples of negative effects included “separation from loved ones,” “combat anxiety,” and “loss of friends.”

Reliability: Internal reliability was higher for desirable than undesirable effects (as = .91 and .62, respectively).

Location: Elder, G., & Clipp, E. (1989). Combat experience and emotional health: Impairment and resilience in later life. *Journal of Personality*, 57, 311-341. Email: Dr. Elder, Glen_Elder@unc.edu

Comment: The measure of resilience in this paper is based upon items in a 100-item California Q Sort. Each item ranges from 1 to 9. Judges read the full set of information on the person and then sort the items into one of the category, from very characteristic to not characteristic. This measurement procedure thus comes at a high cost for those who want to use the measure. Judges need to be trained to apply the Q sort to all members of the study.

References:

Aldwin, C., Levenson, M., & Spiro, A. (1994). Vulnerability and resilience to combat exposure: Can stress have lifelong effects? *Psychology and Aging*, 9, 34-44.

The Posttraumatic Growth Inventory (PTGI)

Authors: Tedeschi & Calhoun (1996).

Variable: Posttraumatic Growth

Description: The Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) is one of the most popular instruments for measuring posttraumatic growth in research. The PTGI comprises 21 items, with response choices ranging from 0–5 (0=‘I did not experience this change as a result of my crisis’; 3=‘I experienced this change to a moderate degree as a result of my crisis’; 5=‘I experienced this change to a very great degree as a result of my crisis’). PTGI items were developed based on a literature review and were administered to college students for the establishment of psychometric properties. Principal component analysis with orthogonal rotation revealed five factors that accounted for about 60% of the variance: (a) relating to others (7 items) (e.g. ‘Knowing that I can count on people in times of trouble’; ‘I accept needing others’); (b) new possibilities (5 items) (e.g. ‘I’m able to do better things in my life’; ‘I developed new interests’); (c) personal strengths (4 items) (e.g. ‘Knowing I can handle difficulties’; ‘A feeling of self-reliance’); (d) spiritual change (2 items) (e.g. ‘I have a stronger religious faith’; ‘A better understanding of spiritual matters’); and (e) appreciation of life (3 items) (e.g. ‘My priorities about what is important in life’; ‘An appreciation of the value of my own life’).

Reliability: Both the full scale (0.90) and the separate subscales (0.67–0.85) of the PTGI have good internal reliability. The PTGI was re-administered to a small group

of students about 2 months later, and the test-retest reliability of the full scale was 0.71. A recent study has since exemplified the PTGI to have similarly high reliability (.93; Shakespeare-Finch et al., 2003).

Validity: The PTGI was positively correlated with certain specific domains of the NEO Personality Inventory (Costa & McCrae, 1985). The strongest correlations were with the Extraversion facets of activity and Positive Emotion, and the Openness facet of Feelings.

Location: Tedeschi, R. G. & Calhoun, L. G. (1996). The Posttraumatic growth inventory: Measuring the positive legacy of trauma: *Journal of Traumatic Stress*, 9, 455-472. Email: Dr. Tedeschi, rtedesch@email.uncc.edu

References:

Park, C., Cohen, L. H., & Murch, R. (1996). Assessment and prediction of stress-related growth. *Journal of Personality*, 64, 71-105.

Shakespeare-Finch, J.E., Smith, S.G., Gow, K.M., Embleton, G., & Baird, L. (2003). The prevalence of posttraumatic growth in emergency ambulance personnel. *Traumatology*, 9, 58-70.

Measure:

Indicate for each of the statements below the degree to which this change occurred in your life as a result of your crisis [**or researcher inserts specific descriptor here**], using the following scale.

- 0= I did not experience this change as a result of my crisis.
- 1= I experienced this change to a very small degree as a result of my crisis.
- 2= I experienced this change to a small degree as a result of my crisis.
- 3= I experienced this change to a moderate degree as a result of my crisis.
- 4= I experienced this change to a great degree as a result of my crisis.
- 5= I experienced this change to a very great degree as a result of my crisis.

- 1. I changed my priorities about what is important in life. (V)
- 2. I have a greater appreciation for the value of my own life. (V)
- 3. I developed new interests. (II)
- 4. I have a greater feeling of self-reliance. (III)
- 5. I have a better understanding of spiritual matters. (IV)
- 6. I more clearly see that I can count on people in times of trouble. (I)
- 7. I established a new path for my life. (II)
- 8. I have a greater sense of closeness with others. (I)
- 9. I am more willing to express my emotions. (I)
- 10. I know better that I can handle difficulties. (III)

11. I am able to do better things with my life. (II)
12. I am better able to accept the way things work out. (III)
13. I can better appreciate each day. (V)
14. New opportunities are available which wouldn't have been otherwise. (II)
15. I have more compassion for others. (I)
16. I put more effort into my relationships. (I)
17. I am more likely to try to change things which need changing. (II)
18. I have a stronger religious faith. (IV)
19. I discovered that I'm stronger than I thought I was. (III)
20. I learned a great deal about how wonderful people are. (I)
21. I better accept needing others. (I)

Note: Scale is scored by adding all responses. Factors are scored by adding responses to items on each factor. Items to which factors belong are not listed on form administered to participants.

PTGI Factors

Factor I: Relating to Others
 Factor II: New Possibilities
 Factor III: Personal Strength
 Factor IV: Spiritual Change
 Factor V: Appreciation of Life

The Change in Outlook Questionnaire

Authors: Joseph, Williams, & Yule

Variable: Positive and negative responses to disaster

Description: The Change in Outlook Questionnaire was developed to assess both positive and negative responses to disaster. It contains 26 items that were drawn from a pool of responses generated by survivors of the Herald of Free enterprise disaster to the question "Has the disaster changed your outlook on life for the better, or for the worse?" Each of the items is rated on a six point Likert scale ranging from strongly disagree (1) to strongly agree (6). Eleven items are considered to be positive response items and 15 items are considered to be negative response items.

Reliability: In terms of reliability, Cronbach's alpha was found to be high for both the positive changes scale (.83) and the negative changes scale (.90), with little correlation between the scales (-.12).

Validity: The negative changes scale was positively correlated with other measures of psychiatric morbidity, however, there was also a trend for the positive changes scale to also be positively correlated with responses to the Impact of Events Scale (IES: Horowitz et al., 1979). This trend warrants further investigation.

Location: Joseph, S., Williams, R., & Yule, W. (1993). Changes in outlook following disaster: The preliminary development of a measure to assess positive and negative responses. *Journal of Traumatic Stress*, 6, 271-279. Email: Dr. Stephen Joseph, S.Joseph@warwick.ac.uk

References:

Horowitz, M., Wilner, N., & Alvarez, W. (1979). The impact of events scale: a measure of subjective distress. *Psychosomatic Medicine*, 41, 209-218.

Measure:

Each of the following statements was made people who experienced stressful and traumatic events in their lives. Please read each one and indicate, by circling the number in the appropriate box, how much you agree or disagree with it AT THE PRESENT TIME:

1 = Strongly disagree, 2 = Disagree, 3 = Disagree a little, 4 = Agree a little, 5 = Agree, 6 = Strongly agree.

	Strongly Disagree	Disagree	Disagree a little	Agree a little	Agree	Strongly Agree
1. I don't look forward to the future anymore.	1	2	3	4	5	6
2. My life has no meaning anymore.	1	2	3	4	5	6
3. I no longer feel able to cope with things.	1	2	3	4	5	6
4. I don't take life for granted anymore.	1	2	3	4	5	6
5. I value my relationships much more now.	1	2	3	4	5	6
6. I feel more experienced about life now.	1	2	3	4	5	6

7. I don't worry about death at all anymore.	1	2	3	4	5	6
8. I live everyday to the full now.	1	2	3	4	5	6
9. I fear death very much now.	1	2	3	4	5	6
10. I look upon each day as a bonus.	1	2	3	4	5	6
11. I feel as if something bad is just waiting around the corner to happen.	1	2	3	4	5	6
12. I'm a more understanding and tolerant person now.	1	2	3	4	5	6
13. I have a greater faith in human nature now.	1	2	3	4	5	6
14. I no longer take people or things for granted.	1	2	3	4	5	6
15. I desperately wish I could turn the clock back to before it happened.	1	2	3	4	5	6
16. I sometimes think it's not worth being a good person.	1	2	3	4	5	6
17. I have very little trust in other people now.	1	2	3	4	5	6
18. I feel very much as if I'm in limbo.	1	2	3	4	5	6
19. I have very little trust in myself now.	1	2	3	4	5	6
20. I feel harder towards other people.	1	2	3	4	5	6

21. I am less tolerant of others now.	1	2	3	4	5	6
22. I am much less able to communicate with other people.	1	2	3	4	5	6
23. I value other people more now.	1	2	3	4	5	6
24. I am more determined to succeed in life now.	1	2	3	4	5	6
25. Nothing makes me happy anymore.	1	2	3	4	5	6
26. I feel as if I'm dead from the neck downwards.	1	2	3	4	5	6

Short Form:

Each of the following statements was made people who experienced stressful and traumatic events in their lives. Please read each one and indicate, by circling the number in the appropriate box, how much you agree or disagree with it AT THE PRESENT TIME:

1 = Strongly disagree, 2 = Disagree, 3 = Disagree a little, 4 = Agree a little, 5 = Agree, 6 = Strongly agree.

	Strongly Disagree	Disagree	Disagree a little	Agree a little	Agree	Strongly Agree
1. I don't look forward to the future anymore.	1	2	3	4	5	6
2. My life has no meaning anymore.	1	2	3	4	5	6
3. I don't take life for granted anymore.	1	2	3	4	5	6
4. I value my relationships much more now.	1	2	3	4	5	6

5. I'm a more understanding and tolerant person now.	1	2	3	4	5	6
6. I no longer take people or things for granted.	1	2	3	4	5	6
7. I have very little trust in other people now.	1	2	3	4	5	6
8. I feel very much as if I'm in limbo.	1	2	3	4	5	6
9. I have very little trust in myself now.	1	2	3	4	5	6
10. I value other people more now.	1	2	3	4	5	6

The Stress-Related Growth Scale

Authors: Park, Cohen, & Murch

Variable: Stress-related growth

Description: The SRGS has 50 items, all positively worded, with a 0-2 response choice (0 = "not at all"; 1 = "somewhat"; 2 = "a great deal"). Items are completed as they pertain to participants' most negative event in the past year (or some other specific time frame). SRGS items reflect positive changes in social relationships; personal resources, including life philosophy; and coping skills. A series of factor analyses were conducted on the 50 SRGS items; participants were college students. Overall, most items loaded the highest on one general factor and the factor structure was not consistent with expectations. College students completed the SRGS twice, once for their most negative event in the past year, and again for their most positive event in the past year. SRGS scores were higher for positive events than for negative events. Park et al. suggested that this difference is consistent with theory on thriving: Positive changes in, for example, interpersonal relationships are expected after a very positive event, whereas they may or may not occur after a very negative event.

Reliability: Cronbach's alpha for the SRGS was .94 in Park et al.'s sample of college students. The SRGS was re-administered to a subsample of these students about 2 weeks later, and the test-retest reliability was .81.

Validity: Park et al. sampled college students' close friends and family members and requested their assessment of the stress-related growth experienced by the students for a particular event. They found a significant positive relationship between students' own SRGS scores and those provided by their informants ($r = .31$ ($p < .05$)). The student-informant correlation was virtually identical when informants were friends versus parents. SRGS scores were positively related to residual change in optimism, positive affectivity, the number of socially supportive others, and satisfaction with social support; these findings support the validity of the SRGS.

Location: Park, C. L., Cohen, L.H., & Murch, R. L. (1996). Assessment and prediction of stress-related growth. *Journal of Personality*, 64, 71-105. Email: Dr. Cohen, lcohen@UDel.Edu

References:

Cohen, L. H., Cimolic, K., Armeli, S. R., & Hettler, T. R. (1998). Quantitative assessment of thriving. *Journal of Social Issues*, 54, 323-334.

Measure:

(A = 0 points, B = 1, C = 2; then add up points for total score)

Instructions: Rate how much you experienced each item below as a result of this past year's most stressful event. For each item, put an A,B, or C in the blank next to the statement.

A = Not at all B = somewhat C = a great deal

1. I developed new relationships with supportive others.
2. I gained new knowledge about the world
3. I learned that I was stronger than I thought I was.
4. I became more accepting of others.
5. I realized I have a lot to offer other people.
6. I learned to respect others' feelings and beliefs.
7. I learned to be nicer to others.*
8. I rethought how I want to live my life.
9. I learned that I want to accomplish more in life.
10. My life now has more meaning and satisfaction.
11. I learned to look at things in a more positive way.
12. I learned better ways to express my feelings.

13. I learned that there is a reason for everything.
14. I developed/increased my faith in God.
15. I learned not to let hassles bother me the way they used to.
16. I learned to take more responsibility for what I do.
17. I learned to live for today, because you never know what will happen tomorrow.
18. I don't take most things for granted anymore.
19. I developed/increased my trust in God.
20. I feel freer to make my own decisions. *
21. I learned that I have something of value to teach others about life.*
22. I understand better how God allows things to happen.
23. I learned to appreciate the strength of others who have had a difficult life.
24. I learned not to freak out when a bad thing happens.
25. I learned to think more about the consequences of my actions.
26. I learned to get less angry about things.
27. I learned to be a more optimistic person.
28. I learned to approach life more calmly.
29. I learned to be myself and not try to be what others want me to be.*
30. I learned to accept myself as less than perfect.
31. I learned to take life more seriously.
32. I learned to work through problems and not just give up.*
33. I learned to find more meaning in life.*
34. I changed my life goals for the better.
35. I learned how to reach out and help others. *
36. I learned to be a more confident person.*
37. I learned not take my physical health for granted.
38. I learned to listen more carefully when others talk to me.*
39. I learned to be open to new information and ideas.*
40. I now better understand why, years ago, my parents said/did certain things.
41. I learned to communicate more honestly with others.*
42. I learned to deal better with uncertainty.
43. I learned that I want to have some impact on the world.*
44. I learned that it's OK to ask others for help.*
45. I learned that most of what used to upset me were little things that aren't worth getting upset about.
46. I learned to stand up for my personal rights.*
47. A prior relationship with another person became more meaningful.
48. I became better able to view my parents as people, and not just as "parents."
49. I learned that there are more people who care about me than I thought.*
50. I developed a stronger sense of "community," of "belonging"--that I am part of a larger "group."

15 item short version = * (based on highest item-total correlations, documented in two samples).

Measures of Hardiness

Taft, Stern, King & King Hardiness Measure

Authors: Taft, Stern, King, & King

Variable: Hardiness

Description: Hardiness measure based on Kobasa's (1979) definition of hardiness. Contains 11 items assessing control, change as challenge, and commitment. Items were chosen from a larger pool of items developed by Kobasa and colleagues. Sample items include: "planning ahead can help avoid most future problems;" "I feel uncomfortable if I need to make any changes in my everyday schedule," and "I really look forward to my work." Each item is scored on a 4-point Likert scale (strongly agree to strongly disagree). All 11 items were summed to obtain a total score, with higher scores reflecting more hardiness.

Reliability: The scale had an internal consistency reliability of .73.

Location: Taft, C. T., Stern, A. S., King, L. A., & King, D. A. (1999). Modeling physical health and functional health status: the role of combat exposure, posttraumatic stress disorder, and personal resource attributes. *Journal of Traumatic Stress, 12*, 3-23. Email: Drs. Dan and Lynda King, dandlking@comcast.net

King et al. Short Hardiness Measure

Authors: King, King, Fairbank, Keane, & Adams

Variable: Hardiness

Description: Eleven items serve as indicators of hardiness. They were chosen from among a larger pool of items developed by Kobasa and her colleagues (see Funk's, 1992, chronology of the assessment of hardiness). The items reflect the three core elements of hardiness proposed by Kobasa (1979): (a) control (e.g., "No matter how hard I try, my efforts will accomplish nothing"; reverse scored); (b) commitment (e.g., "I really look forward to my work"); and (c) change as challenge (e.g., "I feel uncomfortable if I need to make any changes in my everyday schedule"; reverse scored). Each item is accompanied by a 4-point Likert-type response scale, with options ranging from 1 (*strongly disagree*) to 4 (*strongly agree*).

Location: King, L. A., King, D. W., Fairbank, J. A., Keane, T. M., & Adams, G. A. (1998). Resilience-recovery factors in post-traumatic stress disorder among female and male veterans: hardiness, postwar social support, and additional stressful events. *Journal of Personality and Social Psychology*, 74, 420-434. Email: Drs. Dan and Lynda King, dandlking@comcast.net

References:

King, D. W., King, L. A., Foy, D. W., Keane, T. M., & Fairbank, J. A. (1999). Posttraumatic stress disorder in a national sample of female and male Vietnam veterans; risk factors, war-zone stressors, and resilience-recovery variables. *Journal of Abnormal Psychology*, 108, 164-170.

Personal Views Survey (PVS)

Author: Maddi

Variable: Hardiness

Description: 50-item version of the Personal Views Survey (Hardiness Institute, 1985). Participants are given a series of statements and asked to indicate their level of agreement with each one on a scale ranging from 1 (total disagreement) to 6 (total agreement). Based on their responses, an overall hardiness score as well as scores on the three subscales (commitment, challenge, and control) are calculated. Examples of PVS items are "I really look forward to my work" and "Ordinary work is just too boring to be worth doing" (commitment), "What happens to me tomorrow depends on what I do today" and "Most of what happens in life is just meant to happen" (control), and "It's exciting to learn something about myself" and "The tried and true ways are always the best" (challenge).

Reliability: In the current study, estimations of reliability for the total, control, challenge, and commitment were $\alpha = .95, .88, .81$, and $.39$, respectively. Stability estimates for total hardiness have ranged from $.71$ to $.84$ over a 2-week period.

Validity: Factor analyses have confirmed the existence of the three components of hardiness and their predicted positive intercorrelation (Bartone, 1989; Maddi, 1987).

Location: Hardiness Institute. (1985). *The personal views survey*. Chicago: The Hardiness Institute. Email: Dr. Salvatore Maddi, srmaddi@uci.edu, included in PDF format.

Comment: This measure was derived from Kobasa's (1979) original description of hardiness, other measures were published by Maddi and Kobasa but were eventually modified into the current PVS.

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(U) This report provides a detailed literature of the current state of knowledge on resiliency and its application to military personnel workers. In this report we summarize (1) the current, accepted definitions of resiliency, (2) factors contributing to resiliency, (3) theories of resiliency, (4) empirical research findings on resiliency in protecting individuals from adverse outcomes associated with acute or chronic stress, (5) empirical research findings on resiliency in military personnel and other high-risk occupations, and (6) resiliency measures and describe their development and validation. Existing definitions implicate resiliency with the ability to adapt and successfully cope with adversity, life stressors, and traumatic events. However, findings from this review demonstrate the lack of a uniform or accepted definition of resiliency. Research to date has resulted in the identification of several individual traits and environmental situations contributing factors to resiliency, and this has led to recent efforts to develop and validate emerging interactive resiliency factor models. The theoretical bases of resiliency remains controversial and many existing theories have received modest empirical investigation. Furthermore, the methodologies used in many of these conceptually-based studies are poor and results are limited in their generalizability. Empirical research on protective factors remains limited, and their inter-relationships to risk factors and exposure factors remains unclear. Relatively few studies have investigated resiliency in military populations. These studies have primarily investigated protective factors among resilient individuals who have experienced combat exposure (e.g., prisoners of war). Yet, much more is to be learned about resiliency across the range of military personnel experiences (e.g., peace keepers). Lastly, our review identified numerous measures of resiliency, and of related constructs, however, many lack sufficient validation. To further advance our knowledge of resiliency, future research will need to use more sophisticated methodologies and measurement strategies, which can be validated across a range of populations. Such research efforts have the potential to develop and evaluate resiliency based interventions, and aid in social policy applications within military and non-military populations.

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(U) military personnel; Psychological Resiliency; chronic stress; acute stress

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